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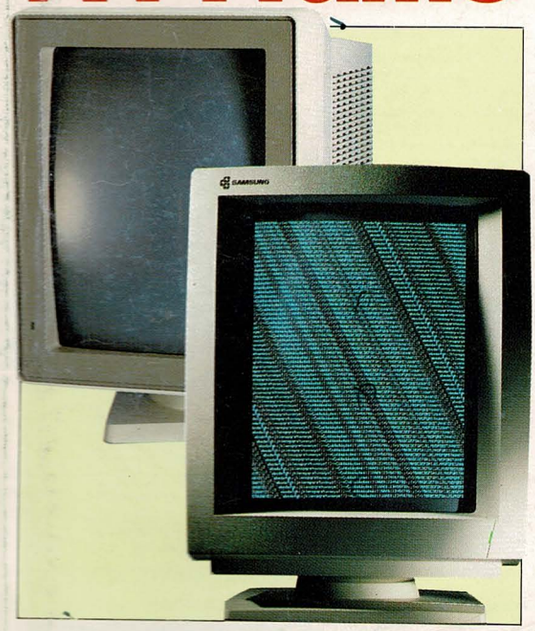
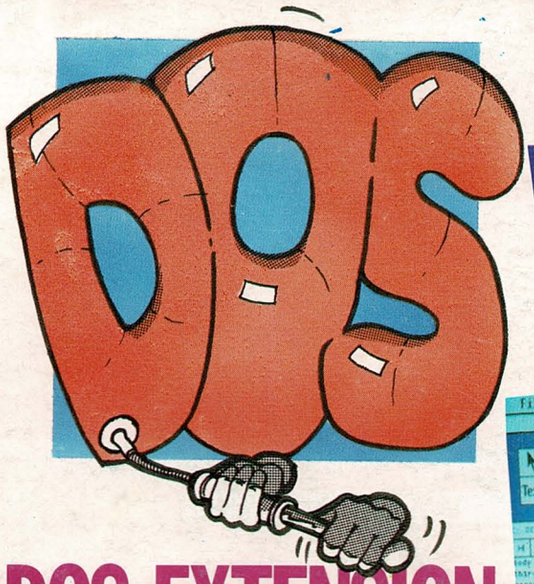
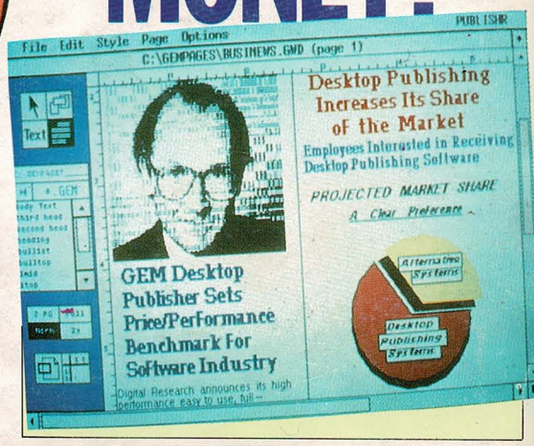




GEM'S DTP: WORTH THE MONEY?



DOS EXTENSION TECHNOLOGY

PUMPING NEW LIFE INTO DOS

ON TOP OF THE WORLD WORKING WITH ARC'S SKYSCRAPER

ALSO IN THIS ISSUE

News from COMDEX USA
Borland's Paradox revisited
Occam conference
Citoh's flatbed dot matrix

SCORING WITH DTP

THIS MONTH – AMSTRAD & IBM PCS ● PSION ● AMIGA ● ATARI ● ARCHIMEDES ● SINCLAIR

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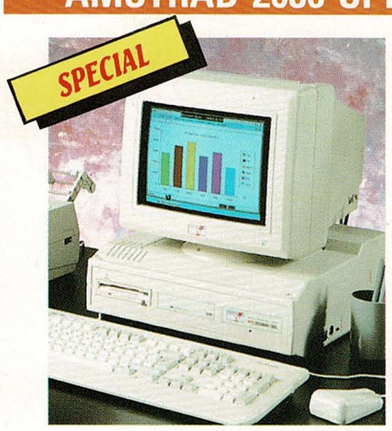

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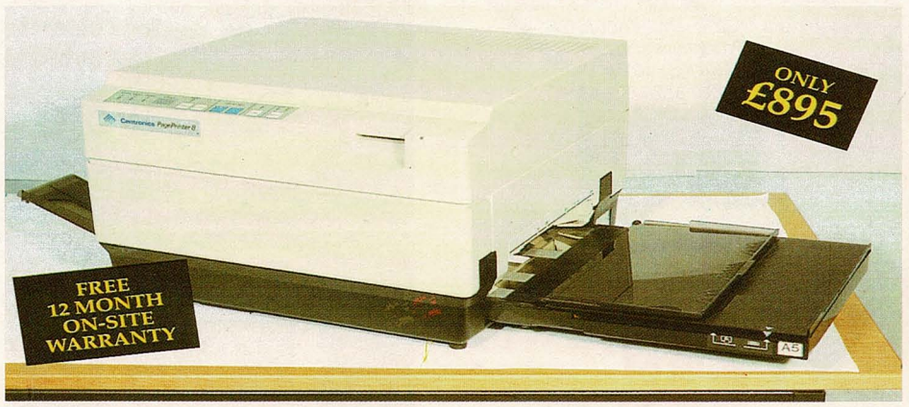

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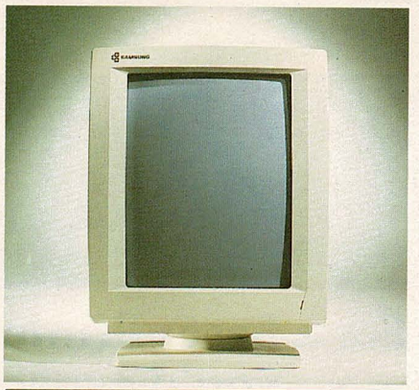

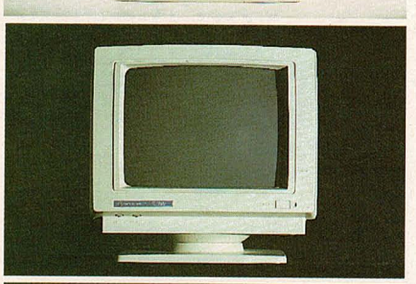

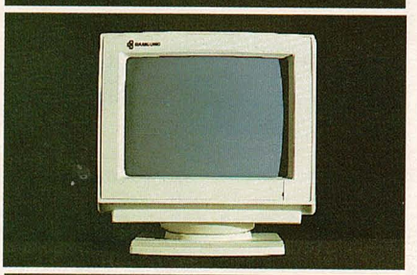

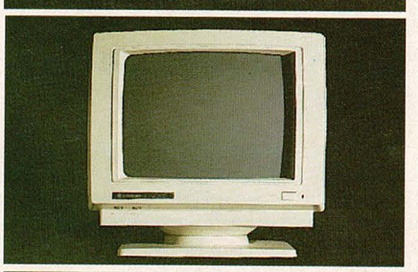

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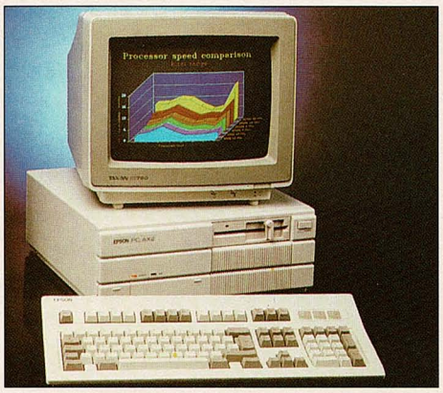

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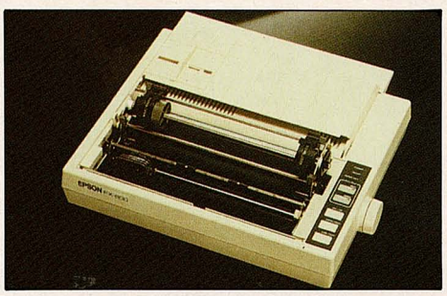

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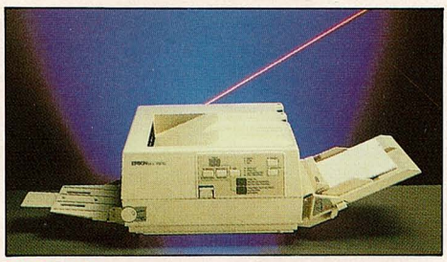

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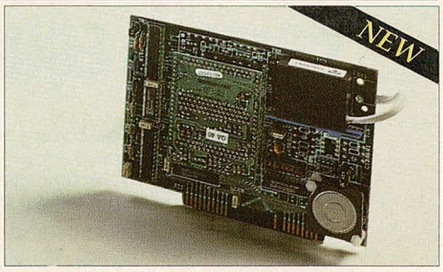

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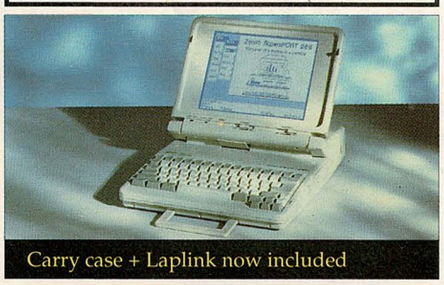

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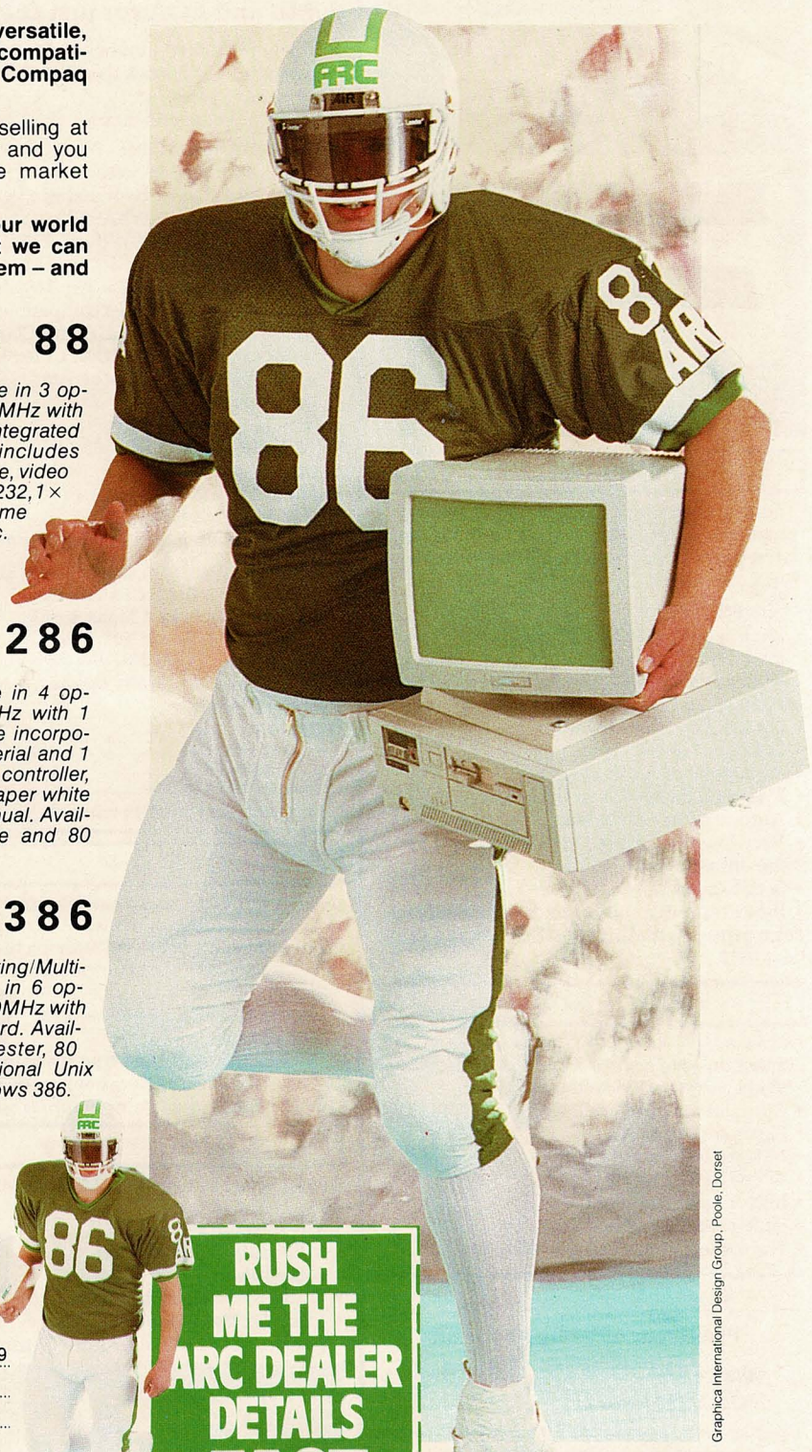

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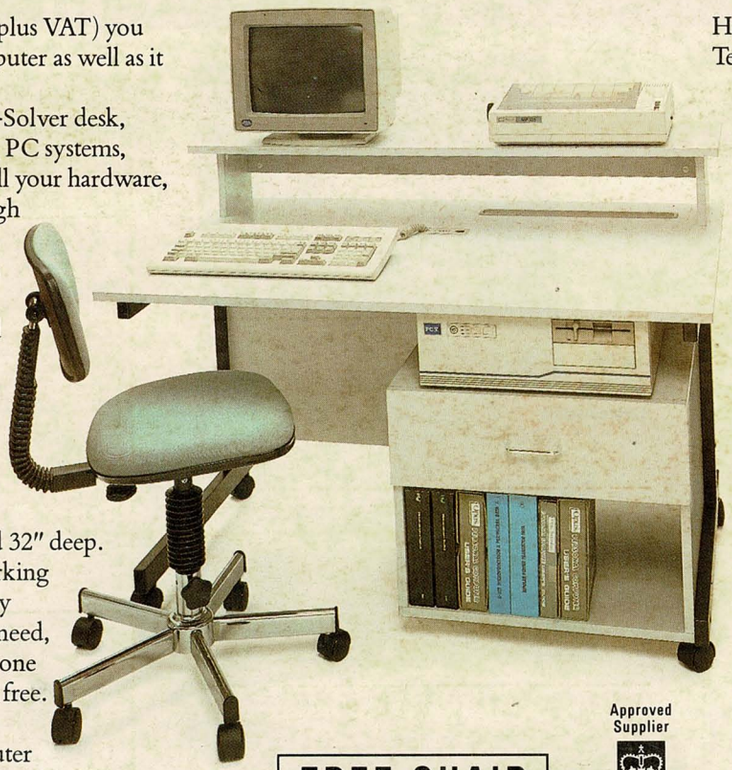

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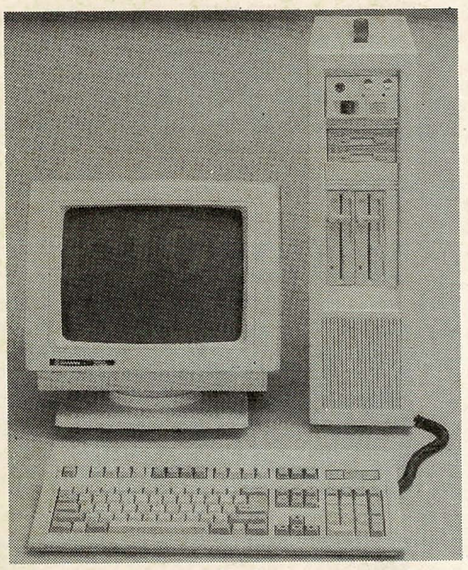

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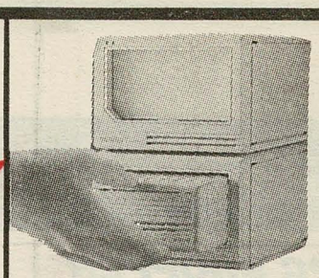

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Issue 16 June 1989

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Emma Nicholson MP speaks out for legal protection against computer hackers.

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Amstrad isn't doing so well, Atari is late, Psion continues to expand and more Mac Clones come to light. Amidst all this, the SAM emerges into the fray.

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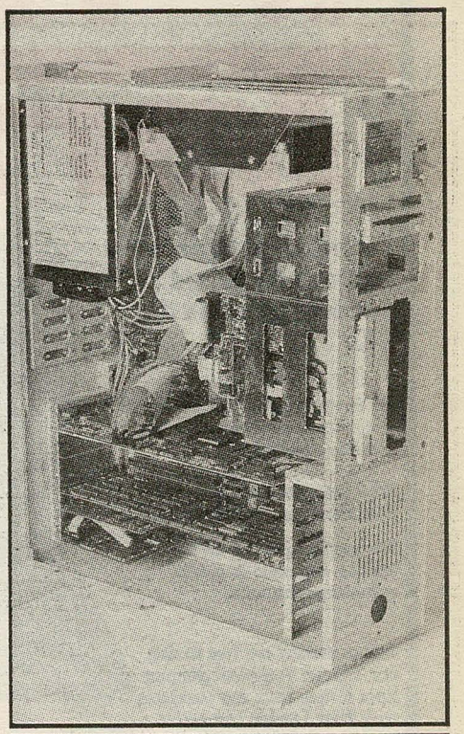
Scoring the DTP way **64**
Gone are the ink-stained thumbs of old. Jon Bates examines the options for those who want to blend computer music with desktop publishing.



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Results of the first PM competition and how to debug while trying to remain sane.

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Graeme Kidd tackles Digital Research's desktop publishing package. What lies behind this product, besides the imaginative name GEM DTP?

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Can Spectre 128 produce a Mac miracle for Atari users? Richard examines this hardware miracle and much more besides.

CIX **98**
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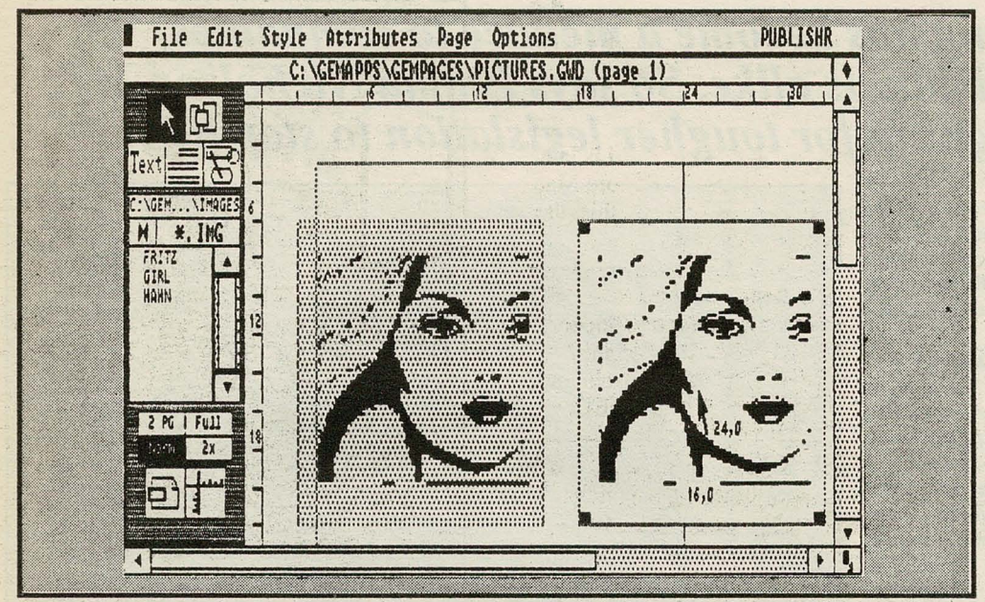

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The clumsy name is the only compromise this computer makes to its competitors. David Robinson field tests ARC's 386.

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The Mac II junior, or Mac IIcx, certainly offers some advantages, but can it be true that Macbiter wouldn't buy one?

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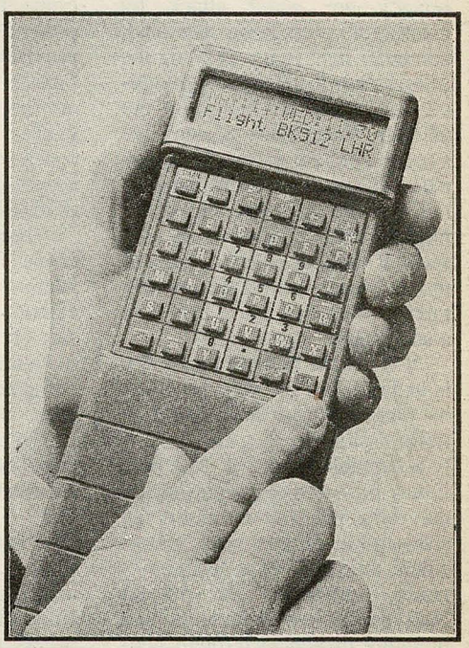

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OPINION

Speaker's Corner

by Emma Nicholson MP

Computer hacking has become a menace to companies, governments and individuals alike. So says Emma Nicholson MP, who is campaigning for tougher legislation to stop it

COMPUTER hacking, once an amusing and amateur game practised by enthusiasts to enhance their own enjoyment of the new technology, has now become a threatening activity to companies, governments and individuals alike. Pitting one's wits against someone else's computer system for fun and not for profit, and with no dire results, has been transmuted into burrowing one's way, unauthorised, into key systems and causing harm. In recent months I have collected a mass of serious cases where company profitability, government security or individual liberty have been significantly threatened or compromised. Citizens' safety and privacy are under attack by means of plundering personal, computer-held files and using the information against the individuals concerned, for money or out of spite. Penetration of sensitive systems, putting national or international security in the balance, has become the rage, and swapping company passwords for subsequent theft or sale to competitors at home or overseas scarcely merits a mention, since it is now a usual habit.

It is not the bulletin board that is at fault, but the way in which its members use the method of transmission for less than socially-acceptable purposes. And here it may be worth reminding others that some bulletin board users fan anti-semitic flames with games where the death of a Jew scores points (enhancing the present Nazi recruitment campaign and literature displayed through non-electronic methods in the UK).

Pornography, yes, although responsible board users give assurances that such material is only accessible to a few people with special passwords and that the people knowing these are carefully vetted by the bulletin board promoters.

The subject of computer misuse is large and complex and proper legislation is now needed to tackle the range of crimes where those carrying out activities cannot be brought to book by the Police, since the computer as victim is not yet covered in law. The computer, as a channel of crime, falls within the present legislative provisions, although further weaknesses are that computer evidence cannot be accepted and that data corporation is unidentifiable in law.

There is much scope for major legislative action to extend the Criminal Act of 1971 to cover malicious damage to computer programs or data.

On April 19th, I put forward a Private Members' Bill entitled 'The Anti-Hacking Bill'. The three key clauses addressed the problems of unauthorised access to a computer (computer hacking), computer eavesdropping (electronic evesdropping) and Police powers to track these criminals down.

If the Government were to adopt this simple bill (it is a short one) then entry above the level of authorisation (in the case of an in-house employee) would be prohibited by law and much of the consequent problems of computer misuse would be stemmed.

I have no doubt that such a law is needed and I am pressing the Government most seriously to consider its adoption and a consequent full piece of legislation on computer misuse.

Emma Nicholson, MP for Torridge and West Devon

WHAT DO *YOU* THINK?

This legislation could affect you. Do you feel that the misuse of computers by hackers warrants legislation? All replies will be passed on to Emma Nicholson MP. Write to *Computer Shopper*, 14 Rathbone Place, London W1P 1DE. You can also send us your replies on Telecom Gold, to 83:JNL525; CIX, on compshop; or *Shopper* BBS on (0892) 661149/ 667072/ 667090/ 667091.

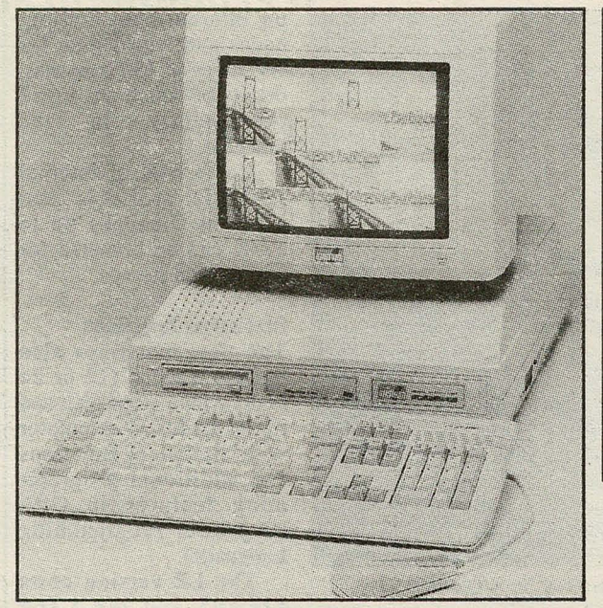
Emma Nicholson, Member of Parliament for Torridge and West Devon since 1985, joined ICL in 1961. She is part way through an Industry and Parliament Fellowship placement with IBM. Her other current Parliamentary campaigns include Hearing Aid Reform, pre-natal toxoplasmosis testing, continuance of the sale of Green Top milk and the banning of Bovine somatotrophin (BSE). She is a Council member of the Parliamentary Information Technology Committee (PITCOM), which staged an exhibition on computer misuse in the House of Commons on Wednesday, 26th April. Her Private Members Bill to outlaw hacking and electronic eavesdropping received First Reading on 19th April.

Amstrad forecasts further fall in profits this year

AMSTRAD, once held up as an example of reliability and punctual delivery dates, continues to suffer problems with its flagship PC2000 machines.

Following Amstrad's unprecedented fall in profits (see *Computer Shopper*, April issue) in the first half of the 1988-89 financial year, the company has issued a statement warning shareholders and the public that second half revenues will be "below market expectation".

The result of the issue of this statement was that Amstrad's share price dropped by 21p on the day of announcement, and plunged down by around 30p in total.



PC 2000s: continuing delays

Pre-emptive action

The official announcement of the financial results for the second half of 1988-89 won't be made until September, which makes Amstrad's early pre-emptive action intriguing. Now City analysts, who were originally expecting to see Amstrad make up to £190 million have readjusted their forecasts to £100 million.

Amstrad is blaming the potential fall in profits on the delayed availability of the PC2000s. This range, intended to herald Amstrad's arrival as a respected corporate PC manufacturer, has been dogged by problems since its launch last autumn.

First, Amstrad chairman Alan Sugar warned that the DRAM chip shortage meant that full production of the PC2000s would not begin until early this year, then production was held up by "minor technical problems". A bug has also been discovered in Microsoft's DOS version 4.01, supplied with the PC2386, which affects the operation of the hard disk.

While delays are still occurring with the range, Amstrad says that it believes that the technical problems have been resolved.

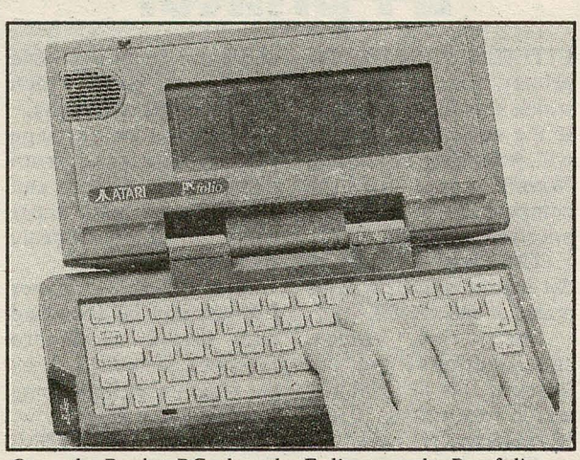
Amstrad's statement

"Amstrad plc, the personal computer and consumer electronics group, has warned that second half profits will be below market expectation due to delayed availability of its new top end PC2000 personal computer range. The production ramp was not in line with predictions due to minor techncial problems, which have now been resolved. The Company views the shortfall in the first quarter of the second half as unlikely to be recovered, although significant deliveries of this new range to all European markets have commenced in April. This will help to strengthen the Amstrad PC brand across Europe, which already holds, according to IDC Research, the dominant position across Western Europe with an average 21.9% of the 8086 business sector."

Atari rechristens Folio at launch

THE ATARI Folio is no more; long live the Atari Portfolio. The tiny laptop, which started life as the Pocket PC, has had yet another name change as first machines are delivered to customers.

The Portfolio was due to be shown at the *PC User* show, in volume for the first time, and although initial shipments were due in the shops at the same time, a spokesman warned that, in true Atari fashion, supplies will be very limited for the first few months. Apparently the USA is getting the lion's share of Portfolios until the autumn.



Once the Pocket PC, then the Folio, now the Portfolio ...

● Atari has also announced a series of price changes to its PC range, in face of increasing pressure on manufacturers to cut prices on 80386-based computers.

The 386-based PC5, packaged with a VGA monitor, now costs £2,299, down from £2,799. The machine is also available without a monitor at £1,999.

The 286-based PC4 has also been reduced, and has been released in a VGA version with 60Mb hard disk for £1,399 – it originally cost £1,699 for an EGA version. The price of the PC3 remains unchanged.

Microprose takes on Telecomsoft

MICROPROSE has emerged as the purchaser of all divisions of Telecomsoft, the leisure software arm of British Telecom.

The deal is reported to have cost Microprose around £2 million, although neither party would confirm that figure.

Microprose UK's boss Stewart Bell says that Microprose will continue to publish the full Telecomsoft product range, from Silverbird budget games to the Rainbird 16-bit titles which are the 'flagship' of the range, although this intention is obviously subject to the desires of development houses concerned.

As *Computer Shopper* went to press, it was unclear whether labels such as Magnetic Scrolls, whose titles – *The Pawn* and *Guild of Thieves* particularly – helped to establish Rainbird as a label, would automatically transfer their contract to Microprose.

Bell reckons that the deal means that Microprose now holds 23% of the UK leisure software market. "We went for Telecomsoft because of the sheer quality of the product; they have some wonderful titles coming up," he said.

Telecomsoft's activities had been put 'on hold' for some months, while a buyer was sought for the division, following an unsuccessful attempt at a management buy-out.

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Psion enhances Organiser II range

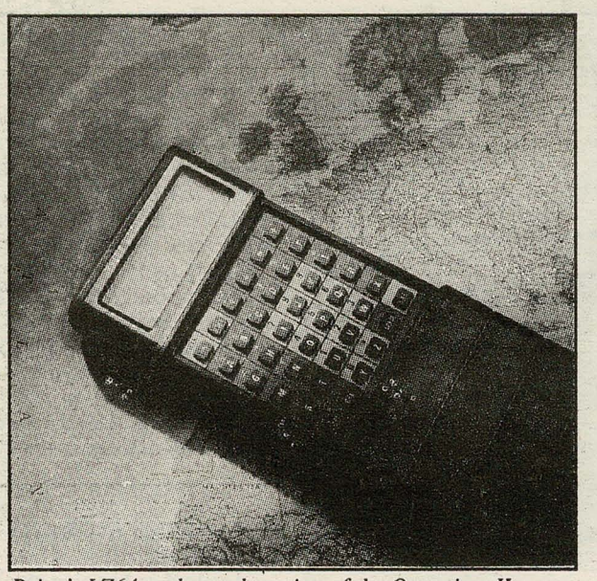
PSION has launched two further models in the Organiser handheld computer range.

Both are upgraded versions of the Organiser II, designed to make the specifications of Psion's devices comparable to those of the newest Far East rival computers, and aimed at the individual needing a diary/organiser rather than for corporate customisation.

They are not, however, Psion's much-rumoured next big development in the portable PC market.

The two new machines, the LZ and LZ64, each have a four line screen wih 20 characters available per line, as opposed to the double line of the current Organisers.

Applications software up to 64K in capacity is built into the device, including a diary module which can be viewed either a day or a week at-a-glance and with appointment slots at 15 minute intervals. The alarm feature is also incorporated here.



Psion's LZ64: enhanced version of the Organiser II

A brand new feature is a free form notepad, developed specifically for the LZ models, which includes calculator operations and has some password protection. Users' files and notepad items can be automatically cross-referenced and sorted alphabetically.

The user can also look up international dialling codes and world time for 400 cities in 150 countries, details of which are stored permanently in the machine.

Up to 64K of internal RAM is available and external Datapaks up to 128K can be accepted for further data storage.

Statistical functions

The new machines also include a clock (12 or 24 hour) with a stopwatch and timer facilities, calculator with statistical functions and additional programming features in OPL (Organiser Programming Language).

The LZ version costs £149.95 and the LZ64 £189.95. Their launch has led to price cuts in the existing Organiser II range to make room for the new models.

The Organiser II CM now costs £79.95 and the XP version £109.95.

Mac clones see the light of day

TWO Macintosh 'clones' may soon be available in this country, imported from both Taiwan and the USA.

The Taiwanese machine is manufactured by Akkord Technology and called Jonathan, uses Mac-compatible BIOS chips (which are the subject of some attention from Apple's legal department) and is being made in both 3.5" drive only and 3.5" plus 40Mb hard disk configurations. The monitor included is a 14" version which will sit on top of the cpu unit.

Akkord claims that an entry level Jonathan may cost as little as $995 – truly remarkable value if the company can produce the machine at that price.

The US Mac II-compatible is called the Blue Maq, and is being developed by Utah-based Powder Blue. In its basic configuration, the Blue Maq comprises a 68000 processor, 4Mb RAM and a 65Mb hard disk. A 12" amber monitor is included, and DOS emulation supplied as standard.

Powder Blue claims that at around three quarters of the price of Mac (between $3,695 and $5,995) the Blue Maq is also up to 90% faster than a Mac II in some applications. Powder Blue also claims that Apple can have no possible legal redress even though the company is using bona fide Apple Mac ROM chips, since they were legitimately sourced from third party dealers.

Both Akkord and Powder Blue are looking to sell their Mac clones in Europe. One UK company already showing interest is Watford Electronics. Watch this space...

Citizen launches low-cost Swift 24 printer

CITIZEN'S Swift 24-printer, first supplies of which should be available at the end of this month, will, according to Citizen, "knock spots off the competition in terms of price/performance".

The Swift 24, 24-pin, dot matrix model, will be priced at under £400.

For this price, specifications are as follows. It will print out text in two widths, 10 and 12 characters per inch.

Claimed speeds at 10cpi are 160 characters per second in draft mode, and 53cps for letter quality print.

At 12cpi, Citizen claims maximum speeds of 192cps in draft mode and 64cps in letter quality.

Four different fonts will be included as standard and extra fonts available on plug-on cards which can be bought as an extra.

The narrow carriage platen will take both continuous paper and single sheets, with paper parking, and an automatic sheet feeder.

Individual paper formats can be specified and stored as macro functions and called up by the user, rather than being redefined each time.

The Swift 24 is IBM, Epson and NEC P6 compatible, with both serial and parallel interfaces.

Although first deliveries should be made from Citizen's Scunthorpe factory towards the end of this month, bulk production is not expected until June.

In brief

● Oxford Digital Enterprises, the programming team which produced the acclaimed *Trivial Pursuits* for Domark, among other titles, has set up a publishing label called Empire in a joint venture with distributor Entertainment International.

The first Empire title to see the light of day will be *Sleeping Gods Lie*, a graphic adventure with 3D style illustrations spread over 64 landscapes. Scheduled for release in June, it will cost £24.99 on the ST, PC (July), and Amiga.

The second title is *Time*, also a graphic adventure, in which the player must travel through well-known historical scenes. *Time* will be out in July, also for the ST, PC and Amiga (price to be finalised).

The other Empire titles already confirmed are *Team Yankee*, which is the game of the book, a cold war thriller, *Paul Gascoigne's Soccer* and *Pipeline*.

● Clares Micros Supplies has released *Render Bender*, a 3D animation package for the Archimedes which uses ray tracing techniques to create on-screen images which can then be compiled into an animated sequence.

Render Bender costs £79.95. Further details from Clares Micro Supplies on (0606) 48511.

● The veteran games software label, Martech, has been closed down by its parent company Software Communications.

David Martin, head of Software Communications, apparently wishes to concentrate on program development, catered for by the company's subsidiaries Emerald Software – based in Ireland – and Intelligent Design.

Martech's most recent hit was *Nigel Mansell's Grand Prix*.

● Action intended to make computer hacking a criminal offence in its own right has been taken by MP Emma Nicholson, who

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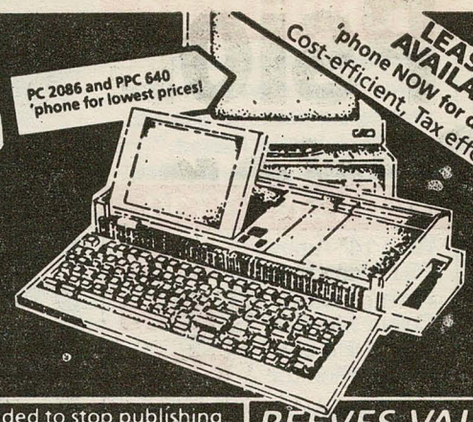

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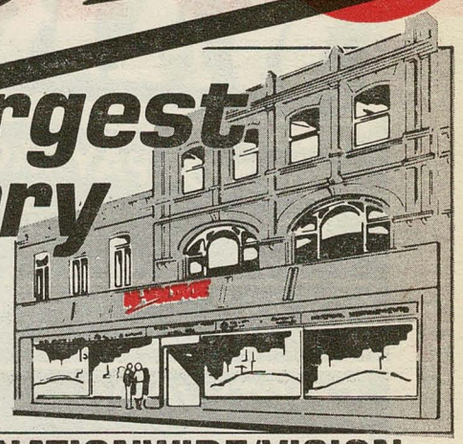

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CS6

In brief

continued from page 18

introduced a Private Members Bill to the House of Commons last week.

Nicholson, Conservative member for West Devon and Torridge, has suggested a maximum prison sentence of 10 years for the new offence of hacking.

She believes that existing possibilities, such as prosecuting hackers for criminal damage if they tamper with data, or fraud if they gain unauthorised access to networks, for example, are not sufficient, and that specific legislation is needed.

In this issue's Speaker's Corner (page 16), Emma Nicholson outlines her case for outlawing hacking.

● Mindscape, the US software publisher which has recently set up a UK division, has made a $4.9 million loss (about £2.9 million) for the year ending December 31, 1988. This is despite an increase in turnover from the prevous year, up 10% to $22 million (around £13 million).

The company blamed this set of disappointing results on the sudden emergence of Nintendo as the dominant hardware manufacturer in the American market – Mindscape only recently became a Nintendo licensee – and the high costs of expansion within the company.

● Maxafit is the sort of printer accessory which appears to have much the same function as go-faster stripes, but for everyone who cannot see the point there will someone else for whom it is the answer to all their prayers.

Maxafit is a cut sheet alignment device. Clipped on to the backplane of the printer behind the platen, it enables the user to line up and position single sheets of printer paper accurately each time – and to re-position paper precisely if you need to overprint something for example.

Maxafit costs £34.50, plus postage and packing. Contact manufacturer Margin Maker on (0784) 457160, for further details.

MGT's Sam scheduled for autumn release

MILES Gordon Technology (MGT) developer of the Sam Coupe machine, (*see Computer Shopper, April 1988 issue*) now says that SAM will become available this September.

Delays have occurred because of the difficulties obtaining the manufacturing tool needed for the Coupe's injection moulding, according to MGT's Robert Collins. This is now expected to be ready and installed in late August, and first batches of the machine should be shipped in September.

Sam Coupe: £150, or bust

Pre-sold production

However, Collins says that the first month's worth of production has already been pre-sold and that machines probably won't appear in the shops until October. The company is also currently negotiating with high street chain stores and distributors in an attempt to have SAM widely stocked from launch.

In addition, two county councils have agreed to 'test bed' the Sam Coupe in primary schools to assess its suitability for educational use – and also presumably to identify any final bugs.

They are also addressing the software question by talking to software companies with a view to persuading them to upgrade Spectrum titles to take advantage of SAM's greater graphic and sound capabilities – a maximum of 64 colours on an 80-column display with six channel stereo sound.

MGT feels that it should be able to score on the reliability and affordability fronts. Many of SAM's operations will be controlled by MGT-designed custom chips, and the finished SAM will have only nine chips on its processor board – thus keeping both costs and the number of moving parts down.

Entry level version

The entry level version of Sam will contain little in the way of extras in terms of disk drives and printer options, although it should incorporate joystick/mouse, MIDI, network and SCART interfaces – another way in which MGT hopes to be able to offer the machine at its target price of £150.

However, the company also hopes to make it as easy as possible for owners to upgrade at a later date and will be offering 3.5" disk drives which users can install into the front of the keyboard casing and a printer interface built into MGT's own expansion cable.

Whatever the precise specification of the finished machine, it is to be hoped that Sam's long gestation period does not mean that interest will have diminished by the time it finally appears. Sam was first publicised before many Spectrum owners had finalised their upgrade plans; by the time it becomes available, significant numbers of them may have moved up to the 16-bit micros already.

Opus's PCIII/20 refines XT line-up

OPUS is pinning its faith in its new British-built low-cost XT-compatible to attract market share from overseas rival clone manufacturers.

The PCIII/20 was launched at the *PC User* show, which was held at Olympia between May9-11.

It joins Opus's rapidly increasing and recently realigned range of PC compatibles as a low cost XT, but with the expansion and support features usually found in more expensive models.

Based on NEC's V20 processor, the PCIII/20 has 640K on-board RAM – expandable internally to 1Mb – a maths co-processor slot, 20Mb hard disk, and the choice of either a 5.25" or 3.5" disk drive. There is also space for a second 3.5" drive to be installed.

The package also includes a high resolution amber screen monitor, with VGA available as an option, and costs £918.85, inclusive of VAT.

Opus's sales director, Martin Breffit, commented, "Most entry-level machines are better-known for their low prices than for their build-quality, expandability, and after-sales support, so the arrival of the PCIII/20 marks a significant new approach in this sector of the market."

Commodore acts on faulty C64s

COMMODORE believes that it has now identified and solved the problems which have led to an abnormally high number of faulty Commodore 64 machines being sold in the shops.

Various dealers have quoted figures of up to 80% of machines sold proving to be faulty, but Commodore, while not denying that there has been a problem, says the figure is nowhere near that high.

"We think the true figure has been nearer 10%, and we have taken steps to rectify the situation," said a Commodore spokesman. Usually, Commodore aims for a returns rate of 3-4% on each batch.

The faults appear to have centred around two problems: one with the external disk drive and the second with the power supply, an external unit, which has historically been the most unreliable component in the 64 in its five year life. Commodore says that the faults have surfaced in a batch delivered from the factory in Braunschweig in Germany just after Christmas.

"They have now changed the way in which the 64s are assembled in the factory and the original problem seems to have been solved," said the spokesman.

Diary

June

● **2-4 Commodore Computer show**, Novotel, London W6. Hardware, software and peripherals for all Commodore machines.

Organised by Database Exhibitions, (0625) 878888.

● **6-8 Unix User show, 1989**, Alexandra Palace, London N22. Exhibition, seminars and conferences hosted by manufacturers of Unix-based systems.

Organised by EMAP Exhibitions, (01) 404 4844.

● **6-8 Computer North**, G-Mex, Manchester. Hardware, software and peripherals for business and professional users.

Organised by Reed Exhibition Companies, (061) 832 4242.

● **20-22 Electronic Publishing 89**, Wembley Conference Centre, Wembley, Middlesex. Seminars, conferences and exhibition area to educate users about corporate publishing systems.

Organised by Blenheim Online, (01) 868 4466.

● **23-25 Atari Computer show**, Alexandra Palace, London N22. Seminars and workshops, hardware, software and peripherals for all Atari computers.

Organised by Database Exhibitions, (0625) 878888.

You are strongly advised to check the details of shows with the organisers before setting out to visit them.

While our information is, to the best of our knowledge, accurate, we cannot accept any responsibility for any errors which may have crept in.

For inclusion in Computer Shopper's guide to forthcoming events, send details to Computer Shopper Diary, 14 Rathbone Place, London W1P 1DE.

Please specify if exhibitions are for trade representatives only, or if there are any trade-only days during the show.

Atari settles on ST summer sweetener

YET another new Atari ST 'bundle' has been launched by Atari, with the company claiming that this time, the package is intended as a long-term seller. "We fully intended to be still selling this pack next Christmas," said a spokesman for the company.

The Atari Power Pack includes £550-worth of software, biased towards leisure and music titles, with the basic 520 STFM. It costs £399, the now-accepted price for ST bundles.

"This time, we've gone to a lot of trouble on the presentation of the pack. It's not a case of slinging the software disks into the box, the disks are contained in a special folder. Certainly, it's more expensively packaged than our previous efforts.

Atari Power Pack: feel the quality as well as the width

The introduction of the Atari Power Pack is, the company says, a major part of its effort to reach a target of an installed user base of 300,000 in the UK by Christmas.

Currently, Atari claims that 190,000 STs have been sold to buyers in this country.

"We'll be disappointed if we don't make it to 250,000 by the end of the year," the spokesman commented.

Power Pack contents

First Basic (HiSoft); *Organiser* (Triangle Publishing); *First Music* (Music Sales); *Control Panel* (Atari); *VT52 Emulator* (Atari); *Xenon* (Melbourne House); *Double Dragon* (Melbourne House); *Nebulus* (Hewson); *Eliminator* (Hewson); *Gauntlet II*; *Outrun*; *Super Huey* (US Gold); *Afterburner* (Activision); *R-Type* (Electric Dreams); *Predator* (Activision); *Super Hang-On* (Electric Dreams); *Black Lamp* (Firebird); *Star-glider* (Rainbird); *Space Harrier*; *Bomb Jack*; *Overlander* (Elite); *Pacmania* (Grandslam); *Star Geese*; *Star Ray* (Logotron); *Bombuzal* (Imageworks).

MGT launches non-machine specific disk drive

AS WELL as announcing the latest developments on the Sam front (see page 22), MGT has also been publicising its Lifetime disk drive.

The idea behind the Lifetime disk drive is that the one device can be used with most popular home computers without any internal modifications. A row of dip switches at the back of the drive unit can each be set to on or off, printer-style, according to which computer is being used.

MGT is also supplying machine-specific cables to interface the Lifetime disk drive to the computer being used.

The drive itself will be available in both 5.25" and 3.5" sizes, the latter, a 1Mb Citizen drive mechanism, becoming available first.

Obviously, production of the Lifetime drive, is more convenient for MGT, which has been manufacturing different disk drives specifically for different machines for over two years, than producing different boards and external casings.

MGT also claims that the Lifetime will be popular with dealers, who won't need to order specific quantities in each machine version. Furthermore, the company maintains that anyone with two computers, or someone who is planning to upgrade within the foreseeable future, will be attracted by the versatility of the Lifetime.

The drives themselves, with an internal power supply, will cost £129.95, and a version with an external power supply is also planned.

Cables to connect the drive to the BBC/Spectrum will cost £10, and cables for other computers (ST, Amiga, PCs and compatibles) will cost £18.50.

Contact MGT on (0792) 791100 for further details.

Aztech and Twillstar sink into liquidation

COMPUTER Shopper has recently received a number of calls from readers enquiring about the hardware and software supplier Aztech Computer Systems and the computer and peripherals dealer Twillstar Computers, following problems that readers had contacting the firms.

This is Shopper's first opportunity to inform its readers that both Aztech and Twillstar have ceased trading, .

Any queries regarding Aztech Computer Systems should be directed to the liquidator, John S Wheatley, at Peat Marwick McLintock, 45 Church Street, Birmingham, B3 2DL, telephone (021) 233 1666.

Enquiries about Twillstar Computers should be made to Leonard Curtis & Co, 30 Eastbourne Terrace, London W2, telephone (01) 262 7700.

GOVERNMENT EDUCATIONAL & OVERSEAS ORDERS WELCOME

RSC LIMITED

ALL PRICES EXCLUDE VAT FREE DELIVERY
(UK MAINLAND)

E.&O.E.

THE RSC COMPUTER RANGE

Not just another OEM, but a real business solution, offering a range of complementary business hardware,now with the addition of the NEW RSC Deskline range of desktop computer systems.All RSC hardware is assembled and configured here in the UK by our own engineers, and fully backed by our Hotline Support Team, giving technical and practical support. The New RSC machines offer ultra-high specification, and unbeatable Value For Money. Simply your best option.

TAILOR MADE SOLUTIONS

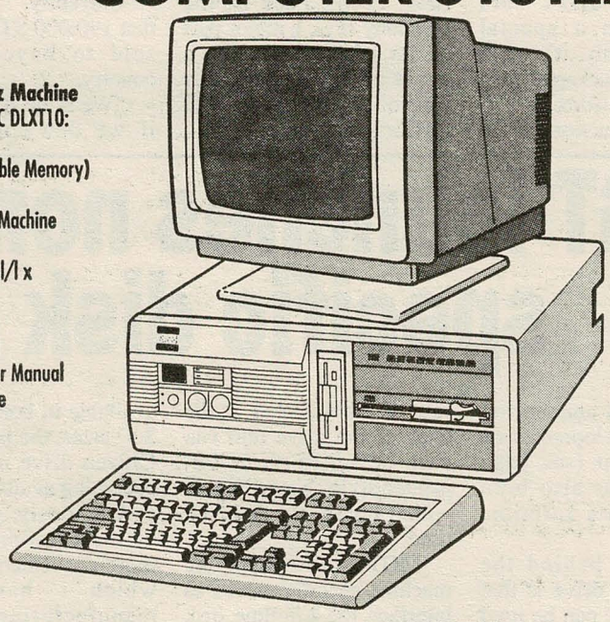
Our understanding of the different needs of individual customers has led us to build-in a high degree of flexibility in the final configuration of any RSC system, we are therefore able to tailor a system to a customer's requirements. RSC will also keep full historical records and provide 12 Months Full On-Site Maintenance for all systems.

THE NEW RSC DESKLINE COMPUTER SYSTEMS

DESKLINE XT

RSC DLXT10- A TRUE 10MHz Machine
Standard Specifications for the RSC DLXT10:
- 200W Power Supply
- 640K RAM on Board (Expandable Memory)
- 1 x 360K/5.25" Floppy Drives
- Graphic Cards-Cards Fitted for Machine Ordered.
- I/O Card (I X Parallel/I x Serial/I x Optional Serial/Game)
- 8 Expansion Slots
- 101/102 Capacitant Keyboard
- MS DOS 3.3 with GW Basic User Manual
- Full Year's On-Site Maintenance

General Features Include:
- 8088 System
- 4.77/10MHz Motherboard
- Legal Bios
- Keylock on Front Panel



DESKLINE AT

RSC DLAT12-High performance AT Desktop
Standard Specifications for the RSC DLAT12:
- 200W Power Supply
- IMb on Board (Expandable to 8Mb on Board)
- 1 x l.2Mb/5.25" Drive
- Graphic Card-Card Fitted to Machine Ordered
- I/O Card - 1 Parallel/1 Serial/1 Optional Serial +
- 8 Expansion Slots
- MS DOS 3.3 with GW Basic User Manual
- 101/102 Capacitant Keyboard
- Full 1 Year's On-Site Maintenance

General Features Include:
- Neat Motherboard with 12 MHz CPU
- 16 MHz Landmark Speed at page interleave
- AMI Bios
- Keylock on Front Panel

RSC DLXT10 OPTIONS & PRICES	MONO	EGA
RSC DLXT10-F/D	£495.00	£695.00
RSC DLXT10-20 H/D	£765.00	£895.00
RSC DLXT10-40 H/D	£845.00	£985.00

To Order 720K 3.5" Fitted Drives for above Systems, Please Add £70.00.

RSC DLAT12 OPTION & PRICES	MONO	EGA	VGA (MONO)
RSC DLAT12-F/D	£825.00	£1025.00	£1125.00
RSC DLAT12-20 H/D	£1125.00	£1325.00	£1425.00
RSC DLAT12-40 H/D	£1225.00	£1425.00	£1525.00
RSC DLAT12-80 H/D	£1425.00	£1625.00	£1725.0

For VGA Colour Please add £100.00 to VGA prices above.
To Order 1.44Mb 3.5" Fitted Drives for above, Add £90.00

EDUCATIONAL, CORPORATE, OR VOLUME PURCHASERS PLEASE CALL FOR ASSISTANCE

Telephone: (0923) 243301

(24 HOURS)

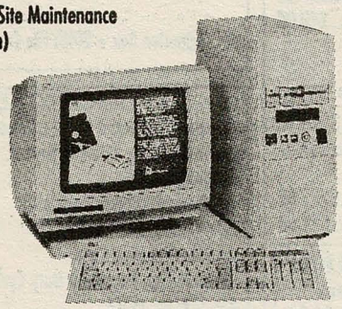
RSC HI-LINE COMPUTER SYSTEMS

The RSC 286T-16 Hi-line System is available as a bare unit or with Mono, EGA or VGA Monitors and can be used as a as a stand-alone Workstation as well as a number of other applications, including; a powerfull CAD machine or a Multi-user LAN File Server.

Specifications (All Fitted as Standard)
- 200W Power Supply
- 2 Mb RAM on Motherboard
- 1 x 1.2Mb 5.25" + 1 x 1.44Mb 3.5" Floppy Drives
- EGA CARD 640 X 480 (Standard Fittings)
- Western Digital Controller
- I/O Card (1 Parallel, 1 Serial, & 1 Game)
- 8 Expansion Slots (6x16 Bit Slots + 2x8 Bit Slots)
- 102 Key Keyboard
- MS Dos 3.3 with GW Basic & User Manual
- Full 12 Month On-Site Maintenance (Extendable option)

General Features include:
- 80286 Motherboard with AMI Bios
- 80286-16 (0 Wait State) HARRIS CPU
- Landmark Test Results 26.7 MHz.
- Turbo & Reset Switches on Front Panel
- Memory Expandable to 16 Megabytes
- Optimized for OS/2 and ZENIX OS
- Keylock on Front Panel for added security

NOTE: A VGA Card is fitted to all VGA Systems.



RSC 286T-16

OPTIONS & PRICES	MONO	EGA	VGA MONO
RSC 286T 40Mb HARD DISK	£1799	£1949	£2049
RSC 286T 80Mb HARD DISK	£1959	£2099	£2199
RSC 286T 122Mb HARD DISK	£2099	£2249	£2349

For VGA Colour please add £100.00 to the above VGA MONO prices

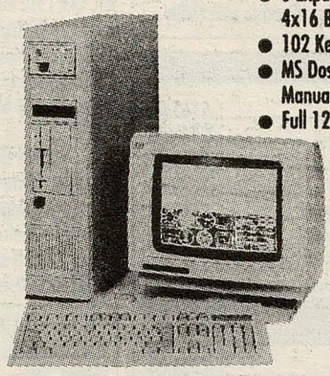
FOR OTHER OPTIONS & PRICES PLEASE CALL

The RSC 386T-20 Hi-line System is also available as a bare unit or with Mono, EGA or VGA Monitors and can be used as a stand-alone Workstation, a powerfull CAD machine or a multi-user LAN File Server.

General Features include:
- 80386 Motherboard with AMI Bios
- 80386-20 (0 Wait State) CPU
- Landmark Test Results 32 MHz. (31.6MHz)
- LCD Display & Turbo Switches on Front Panel
- Memory Expandable to 16 Megabytes
- Optimized for OS/2 and ZENIX OS
- Keylock on Front Panel for added security

NOTE: A VGA Card is fitted to all VGA Systems.

Specifications (All Fitted as Standard)
- AT Case with 220W Power Supply
- 2 Mb RAM on Motherboard
- 1 x 1.2Mb 5.25" + 1 x 1.44Mb 3.5" Floppy Drives
- EGA CARD 640 X 480 (Standard Fittings)
- Western Digital Controller
- I/O Card (1 Parallel, 1 Serial, & 1 Optional Serial.
- 8 Expansion Slots (1x32 Bit Slot + 4x16 Bit Slot + 3 x8 Bit)
- 102 Key Keyboard
- MS Dos 3.3 with GW Basic & User Manual
- Full 12 Month On-Site Maintenance



RSC 386T-20

OPTIONS & PRICES	MONO	EGA	VGA MONO
RSC 386T 40Mb HARD DISK	£2229	£2379	£2479
RSC 386T 80Mb HARD DISK	£2389	£2539	£2639
RSC 386T 122Mb HARD DISK	£2539	£2689	£2789

For VGA Colour please add £100.00 to the above VGA MONO prices

FOR OTHER OPTIONS & PRICES PLEASE CALL

If you need a 20MHz CPU with 64K Cache Memory Motherboard please add £225.00 to prices shown.

FOR INTERNAL & EXTERNAL TAPE STREAMERS SEE THE COMPUTER PERIPHERALS SECTION

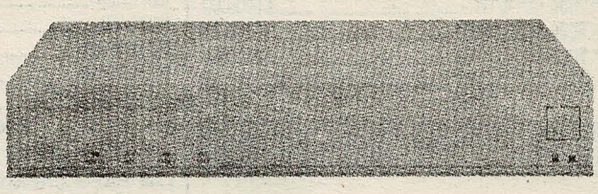
RSC DATA SECURE DISKLESS INTELLIGENT PC TERMINALS

RSC Diskless Terminals ensure absolute data security for all your files and documents. Slim, Low Cost, High Performance Intelligent LAN Stations that guarantee confidentiality at budget prices. The RSC AT D/L Station can be extended to 4Mb. Options include a 3.5 Hard Disk Sub-System with 20-50Mb, an ANSI Terminal Emulation Card (AE-100). Both the XT & AT Stations have a full 12 month guarantee.

RSC - AT Diskless Terminal Specifications:

CPU:	80286 -10 CPU (80287 Math Co-processor Option)
MEMORY:	640k RAM on Motherboard (Option of 4Mb on Motherboard using 1Mb DRAM chips)
SYSTEM INTERFACE:	Two RS232C Serial Interface for Modems & Mouse etc. 1 Parallel Interface.
SPEED:	12MHz 1 wait state.
SLOTS:	One 16 bit and Two 8 bit expansion slots. Note: Two of these are used for Display and LAN cards.
KEYBOARD:	102 Key Keyboard included.
DISPLAY INTERFACE:	MGA, Hercules compatible.
BOOT ROM:	8k Boot ROM space for diskless operation
DIMENSIONS:	41 (Wide) x 37.5 (Long) x 7 (High) - CM's

RSC AT D/L Terminal.....£595.00



RSC - XT Diskless Terminal Specifications:

CPU:	10 MHz 8088-1 CPU (8087 Co-processor option)
MEMORY:	640k DRAM on board
SYSTEM INTERFACE:	1 RS232 serial interface and 1 parallel
SLOTS:	3 x 8 bit expansion slots. Note: two of these are used for Display and LAN cards.
DISPLAY INTERFACE:	Mono & Hercules compatible.
KEYBOARD:	102 Key Keyboard included.
BOOT ROM:	8k Boot ROM space for diskless operation
DIMENSIONS:	41 (Wide) x 37.5 (Long) x 7 (High) - CM's

RSC XT D/L Terminal.....£395.00

EDUCATIONAL, CORPORATE, OR VOLUME PURCHASERS PLEASE CALL FOR ASSISTANCE

RSC Limited, 75 Queens Road, Watford, WD1 2QN
Fax: (0923) 37946 Telephone (0923) 243301
Callers welcome

AMSTRAD PCW RANGE

PCW 8256 ..... £315.00
PCW 8512 ..... £400.00
PCW 9512 ..... £395.00

PC1512

Amstrad PC1512 SD Mono £375.00
Amstrad PC1512 DD Mono £465.00
Amstrad PC1512 SD Colour £475.00
Amstrad PC1512 DD Colour £545.00

RSC - AMSTRAD SPECIAL OFFER

Special RSC - Amstrad package includes Amstrad 3160 Dot Matrix Printer, 10 Blank Disks & Mouse Mat.
Amstrad PC1512 SD Mono £475.00
Amstrad PC1512 DD Mono £565.00
Amstrad PC1512 SD Colour £565.00
Amstrad PC1512 DD Colour £665.00
Free with every PC1512 4 US gold games and Ability

PC1640

Amstrad PC1640 SD/MD Mono £465.00
Amstrad PC1640 DD/MD Mono £545.00
Amstrad PC1640 SD/CD Colour £565.00
Amstrad PC1640 DD/CD Colour £635.00
Amstrad PC1640 SD/ECD Enhanced £660.00
Amstrad PC1640 DD/ECD Enhanced £720.00
1512/1640/2086 ON-SITE MAINTENANCE ADD £25.00

GENUINE AMSTRAD HARD DISK MACHINES

Amstrad PC1640 HD20/MD Mono £720.00
Amstrad PC1640 HD20/CD Colour £810.00
Amstrad PC1640 HD20/ECD Enhanced £910.00
HARD DISK ON-SITE MAINTENANCE PLEASE ADD £30.00

RSC's OWN PC1512 & PC1640 COMBINATIONS

PC1512 SD Mono + 32Mb Card £575.00
PC1512 SD Colour + 32Mb Card £675.00
PC1512 DD Mono + 32Mb Card £665.00
PC1512 DD Colour + 32Mb Card £745.00
PC1640 SD/MD Mono + 32Mb Card £665.00
PC1640 DD/MD Mono + 32Mb Card £745.00
PC1640 SD/CD Colour + 32Mb Card £765.00
PC1640 DD/CD Colour + 32Mb Card £835.00
PC1640 SD/ECD Enhanced + 32Mb Card £860.00
PC1640 DD/ECD Enhanced + 32Mb Card £920.00

PC1512 & PC1640 ADD-ON FLOPPY DRIVES & ACCESSORIES

Amstrad FD3 Second 5.25" Drive 1640/1512 ..... £130.00
RSC FD6 3.5" Second Drive for 1640/1512 ..... £89.00
RSC FD10 External 3.5" Drive for 1640/1512 ..... £89.00
RSC CA9 1512 Extension (2 Cables VDU & Power) £13.95
RSC CA21 PC Keyboard Extension (6 Feet) £5.50
RSC CA22 PC Mouse Extension (6 Feet) £7.50
128K upgrade (18 Chips)1640/1512 ..... £40.00
(Please specify which model)

CIPHER 1525 DATA BACKUP

Avert data disaster - backup with Cipher. Holds 25Mb on a single cartridge. Save/Restore rate of 1Mb per minute. External with its own power supply.
Cipher 1525 (For Amstrad PC 1512 & 1640) £275.00
3M DC600A Data Cartridge £22.00

RSC 1512/1640 INTERNAL H/D KITS

The Kit consists of Controllers, Cables & Mountings
RSCAM 2Mb £189.00
RSCAN 40Mb £259.00
RSCAM 60Mb £359.00

AMSTRAD PORTABLE PC

with FREE box of 3.5" Disks

PPC512 SD Single Drive £385.00
PPC512 DD Dual Drive £465.00
PPC640 SD Single Drive with Modem £450.00
PPC640 DD Dual Drive with Modem £559.00
FD5 Add-On Second Disk for PPC £129.00
PPC 512/640 ON-SITE MAINTENANCE ADD £30.00

RSC - AMSTRAD SPECIAL OFFER

PPC 512 DD complete with 12" Monochrome Monitor £490.00
PPC 640 DD complete with 12" Monochrome Monitor £585.00
PPC512/640 ON-SITE MAINTENANCE ADD £30.00

NEW PPC EXPANSION BOX

A mains powered device which gives you 2 full length expansion slots. By using this device you can fit File cards, Video cards and a whole host of other peripherals.
RSC Special Price £180.00

PPC Expansion Box + 20Mb File Card £360.00

RSC AMS-102 KEYBOARD

A superb keyboard with soft touch for added speed, and an Industry standard layout.
Features include:
- Enhanced AT Style Keyboard
- Amstrad Cable Adaptor
- Twelve Function Keys
- 100 Million Keystroke Duty Cycle

RSC SPECIAL PRICE £85.00

ALL PRICES EXCLUDE VAT

AMSTRAD PC2086

PC2086 SD12/MD £550.00
PC2086 SD14/CD £685.00
PC2086 SD12/HRCD £775.00
PC2086 SD14/HRCD £865.00
PC2086 DD12/MD £675.00
PC2086 DD14/CD £795.00
PC2086 DD12/HRCD £890.00
PC2086 DD14/HRCD £970.00
PC2086 HD12/MD £885.00
PC2086 HD14/CD £1000.00
PC2086 HD12/HRCD £1100.00
PC2086 HD14/HRCD £1200.00
FOR PC2086 ON-SITE MAINTENANCE PLEASE ADD £25.00

RSC's OWN PC2086 COMBINATIONS (inc Western Digital Hard Cards)

Amstrad PC2086 SD12/MD + 32Mb Card £750.00
Amstrad PC2086 SD14/CD + 32Mb Card £885.00
Amstrad PC2086 SD12/HRCD + 32Mb Card £975.00
Amstrad PC2086 SD14/HRCD + 32Mb Card £1060.00
Amstrad PC2086 DD12/MD + 32Mb Card £875.00
Amstrad PC2086 DD14/CD + 32Mb Card £995.00
Amstrad PC2086 DD12/HRCD + 32Mb Card £1090.00
Amstrad PC2086 DD14/HRCD + 32Mb Card £1170.00
HARD DISK PC2086 ON-SITE MAINTENCE ADD £30.00

ALL PRICES EXCLUDE VAT

AMSTRAD PC2286

DD12/MD £950.00
DD14/CD £1095.00
DD12/HRCD £1190.00
DD14/HRCD £1285.00
HD12/MD £1285.00
HD14/CD £1395.00
HD12/HRCD £1525.00
HD14/HRCD £1615.00

AMSTRAD PC2386

HD12/MD £2485.00
HD14/CD £2625.00
HD12/HRCD £2720.00
HD14/HRCD £2805.00

PC2000 SERIES ADD-ONS

RSC TS-40E External 40Mb Tape Streamer £269.00
CDC 2000 40Mb Data Cartridge (for above) £18.00
RSC FD16 External 5.25" 360k Drive £75.00
RSC FD23 External 5.25" 1.2Mb & 360K Drive £110.00
(Switchable & Terminal Powered)
RSC FD24 External 5.25" 1.2Mb Drive £89.00
RSC FD18 External 3.5" 1.4Mb Drive) £110.00

HARD DISK INTERNAL 2086 KIT RSAM 30 RLL

Consists of 3.5" Drive running at 35Ms-Complete Fittings included. £265.00

RSC-AMSTRAD SPRING/SUMMER SPECIAL PROMOTION

The Offer is a 2086 + Printer + Software. With the choice of 3 models-single drive/Double Drive & Hard Drive-and the choice of 2 Printers-LQ35U0 24pin 60NLQ/80Col RRP 349.00 or LQ5000 24pin/288cps/132col RRP 449.00-we know our offer can't be beaten.The S/W is Lotus Symphony V.2 RRP £55.00 .An Integrated Package consisting of 5 fully Integrated Programmes for Analysing, Planning,& Communicating.Can be used separately,or in any combination.

						SINGLE DRIVE	DOUBLE DRIVE	HARD DRIVE
2086	+	LQ3500	+	LOTUS	+ 12" MONO	£929.00	£1055.00	£1269.00
2086	+	LQ3500	+	LOTUS	+ 14" CD	£1069.00	£1195.00	£1419.00
2086	+	LQ3500	+	LOTUS	+ 12" HRCD	£1159.00	£1279.00	£1499.00
2086	+	LQ3500	+	LOTUS	+ 14" HRCD	£1255.00	£1365.00	£1589.00
2086	+	LQ5000	+	LOTUS	+ 12" MONO	£1019.00	£1149.00	£1359.00
2086	+	LQ5000	+	LOTUS	+ 14" CD	£1159.00	£1285.00	£1499.00
2086	+	LQ5000	+	LOTUS	+ 12" HRCD	£1249.00	£1379.00	£1589.00
2086	+	LQ5000	+	LOTUS	+ 14" HRCD	£1345.00	£1469.00	£1679.00

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(24 HOURS)

PSION ORGANISER

NEW PSION ORGANISERS

- Bigger screen-80 characters x 4 lines ● World Times
- Week at a view calender ● Note Pad
- Password Protection ● Data Encruption
- Timer & Stopwatch ● International Dialling Codes

Psion LZ 64K Rom, 32K Ram 128K max
Data Pack Size £125.00
Psion LZ64 64K Rom, 128K Ram, 128K max
Data Pack Size £155.00

Psion Organiser II XP £89.00
Psion Portable Printer £169.00

Mains Adaptor	£11.00	32K Data Pack	£29.00
64K Data Pack	£49.00	128K Data Pack	£80.00
32K RAM Pack	£40.00	8K Data Pack	£11.00
16K Data Pack	£17.00	RS232 Link	£49.50
Formatter	£39.00	Formulator	£24.00
Organiser Developer	£42.00	Diary Link	£11.00
Filemaster	£35.00	Finance Pack	£24.00
Maths Pack	£24.00	Portfolio	£42.00
Spell Checker	£24.00	Spreadsheet	£32.00
Leather Case 1	£11.00	Leather Case 2	£58.00

ZENITH PORTABLES

Zenith SupersPORT 2 (2 x 720k Disk Drives) £975.00
Zenith SupersPORT 20 (20Mb Hard Drive) £1835.00
Zenith SupersPORT 286 20Mb Hard Disk £2270.00
Zenith SupersPORT 286 40Mb Hard Disk £2675.00
Zenith TurbosPORT 386 ..... £3600.00

N.B MACHINES ARE NOT CONVERTED US IMPORTS

NEW EPSON PORTABLE

The NEW Epson AX-Portable with an 80286 Processor Features include:

- 640K RAM (Expandable to 4.6Mb)
- 1.44Mb Disk Drive
- 16 Bit Expansion Slot
- 640 x 400 Display with 8 shades of grey

SPECIAL RSC PRICE £2169.00

ALL PRICES EXCLUDE VAT

NEW SHARP PORTABLES

SHARP PC5541 (286) AT 12MHZ; 40MB; 25MS
1.44MB F/D/D. VGA COMPATIBLE; WHT DISPLAY;
640X480 HIGH RES;SERIAL/PARALLEL PORT;640KRAM;
DOS3.3 ..... £2499
SHARP PC4641 XT;640K RAM;40MB HARD DISK;1XF/D/D
640x400;45MS;10MHX £1589
SHARP PC4602-AS ABOVE+2X3.5 F/D, 640K RAM £949

ATARI FOLIO

- PROCESSOR 80C88-4,9152MHZ Clock Speed
- 128K
- Internal ROM 256K (containing Bios)
- Mass Storage:Memory Card 32K/128K/ROM
- Memory Expansion:RAM Expansion to 640K (extra memory card slot)
- Pocket Operating Sytem; Compatible with MS DOS 2.11
- PC Compatible ROM Bios;Applications S/W Interface
- Lotus 1-2-3 File Compatible Spreadsheet;Time Manager;Address & Phonebook;Text Processor;Sophisticated Calendar Communications S/W.

RSC Price ..... £POA

COMPUTER PERIPHERALS

RSC - UPS UNINTERUPTED POWER SUPPLY

- Attractive Slimline Design ● Under Voltage Protection
- EMI & RFI Line Filtering ● Over Voltage Protection
- 8 Ms Instant Power Transfer

RSC 550 (550VA) £259.00
RSC UPS 1000 (1000VA) £449.00

ADD ON FLOPPY DRIVES

BARE DRIVES

RSC19 (5.25" DRIVE) £55.00
RSC20 1.2Mb (5.25" DRIVE) £75.00
RSC21 720K (3.5" DRIVE) £65.00
RSC22 720K/1.44Mb (3.5" DRIVE) £79.00

CITIZEN ● JVC ● NEC
FOR ALL MACHINES OTHER THAN AMSTRADS

HARD DISKS

5.25" Half Height Seagate

RSC225	20Mb - MFM 65MS	£165.00
RSC238R	30Mb - RLL 65MS	£185.00
RSC251	40Mb - MFM 40MS	£235.00
RSC251F	40Mb - MFM 28MS	£285.00
RSC277R	75Mb - RLL 40MS	£269.00

5.25" Full Height Seagate

RSC4053	40Mb - MFM 28MS	£355.00
RSC4096	80Mb - MFM 28MS	£445.00
RSC4144R	122Mb - RLL 28MS	£595.00

HARD DISKS

Winchester Controllers

MFM XT 2 Drives £49.00
RLL XT 2 Drives £54.00
MFM AT 2 Drives £85.00
RLL AT 2 Drives £89.00
1.1 Interleave WD 1006- WAH Controls 2 F/D £115.00

Winchester Floppy Controllers

MFM AT 2 F/D ..... £ 85.00

HARD CARDS

Western Digital 21Mb £185.00
Western Digital 32Mb + FREE Xtree S/W £205.00
Seagate 32Mb 40Ms running speed +.FREE S/W £225.00

EXTERNAL HARD DRIVES

- PC Stack High Performance External H/D Sub-Systems for all Amstrad XT/AT Ranges.
- SCSI Interface gives 2/3 times sustained Data Output of MFM H/D.
- Easily Expandable upto 7 devices (Daisy linked)
- Ideal for CAD,DTP,& Network Users.
- Runs at 28Ms
- RKits include Controller Card & Cable

RSC-PC Stack 30 ..... £399.00
RSC-PC Stack 45 ..... £599.00
RSC-PC Stack 80 ..... £899.00

HIGH CAPACITY HARD DRIVES

SCSI Drives-easily installed/fully featured 5.25" High Performance SCSI based Disk Drives,for PC/XT/AT/IBM & Compatibles. A Standard PC PAK contains:

- RASCI based Drive
- RASCI to PC Bus host adaptor,that will support 2 x Floppy Disk Drives & a SCSI tape back-up.
- RCables and Mounting Hardware
- RInstallation S/W for DOS/SCO/Xenix & Novell Netware 286 V2.1
- RComplete easy to follow H/W and S/W Installations

MIC PC P AK GUIDES/1375 145Mb (SCSI) £995.00
MIC PC P AK GUIDES/1578 380Mb (SCSI) £1795.00

TAPE STREAMERS

WANGTEK Internal Tape Streamers

40Mb Half Height PC/ST/AT/386 ..... £275.00
60Mb Half Height PC/XT/AT/386 ..... £495.00
125Mb Half Height PC/XT/AT/386 ..... £595.00
150Mb Half Height PX/AT/386 ..... £645.00

WANGTEK External Tape Streamers

40Mb PC/XT/AT/386 ..... £385.00
60Mb PC/XT/AT/386 ..... £675.00
25Mb PC/XT/AT/386 ..... £745.00
150Mb PC/AT/386 ..... £795.00

Data Cartridges (for above)

40Mb £17.00
60/125Mb £22.00
150Mb £25.00

CHIPS & EXPANSION CARDS

Intel 8087-2 8MHz Maths Co-processor £129.00
Intel 80287-8 Maths Co-processor £185.00
Intel 80387-20 Maths Co-processor £375.00
64k DRAM chips (9 to make 64k) ..... P.O.A
256k DRAM chips (9 to make 64k) ..... P.O.A
Serial Card £26.00
Parallel Card £26.00
Serial/Parallel Card £59.00
MGA Card £59.00
EGA Card £149.00
VGA Card £189.00
NEC V30 (Replacement for 8086) £26.00
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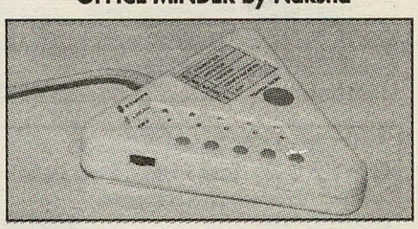

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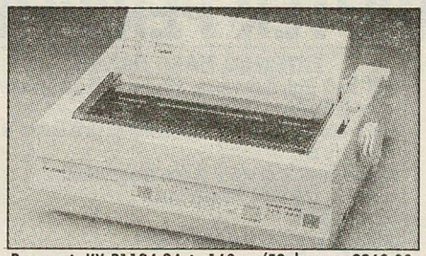

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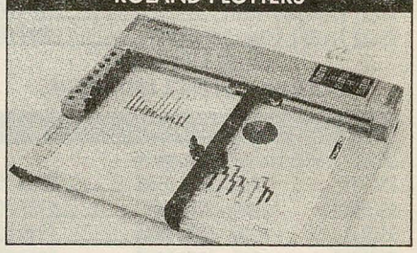

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System Spot

by Kay Ewbank and Mike James

UI Programmer Version II unveiled

Nantucket, the producer of the *dBase* compiler *Clipper*, has released a new version of Wallsoft's *UI Programmer*.

UI programmer, which is distributed by Nantucket in Europe, is a code generator for user interfaces. It embodies help systems, screen displays, menus and report layouts. The new version can be configured for C, Pascal, *Clipper* or *dBase*, and includes an integral data dictionary. This allows programmers to load, save, define, or modify data structures, including any .DBF definitions. This ranges from field definitions and associated indexes to related files. Once the definition is to the programmer's liking, it can be stored within a central data dictionary to become global definitions.

UI 2.0 has enhanced versions of the screen and report designing tools, with templates for bounce bar menu systems, scrolling PopUp windows, multiple page entry screens, multi-file reports and one-to many relational look-up enquiries.

The cost of *UI 2.0* is £350, with updates from version one costing £150.

Apple talks to BBC

Human-Computer Interface, in conjunction with Apple Computer UK, has launched a range of products for connecting together Apple Macintoshes and BBC Micros. Apple is making a big push in the education sector, and is having particular success in Scotland, with Fife, Strathclyde and Lothian regions all placing large orders for Apples. Fife has ordered an Apple Mac for every school in its region.

Human Computer Interface believes that this will be a growing trend, and that the Apple Macintosh is the computer of the 1990s for schools and colleges. One problem for schools wishing to switch to Apples is that they often already have a significant investment in BBC Micros, and software to run on them.

The new products launched by Human Computer Interface are *BBC>>Mac*, *BBC Basic* and the *BBC Emulator*.

BBC>>Mac makes the BBC filing system appear on the Mac desktop as if it were an external disk drive. Facilities are provided for file transfer and printing. The files on the BBC end can either be floppy disk drives or hard drives, or can be on an Econet file server.

BBC Basic allows the programmer to write in BBC Basic on the Apple Macintosh, and includes emulation features so that a high proportion of existing educational software developed on the BBC Micro can be run without difficulty.

The *BBC Emulator* allows an Apple Macintosh to emulate a BBC Micro. This allows language or applications ROMs to be transferred to the Apple from the BBC Micro via a serial cable, saved and run on the Apple Mac so long as copyright restrictions are not infringed.

Human Computer Interface specialises in products for the Apple Macintosh, and is in a good position to know about the BBC Micro market as its managing director, David Johnson-Davies, was previously managing director of Acornsoft, the software division of Acorn, which produced the BBC Micro.

Lift off for PolyAWK toolbox programming language

The Software Construction Company (TSCC), which distributes Polytron's products in this country, has announced the launch of a new version of PolyAWK, the 'toolbox' programming language. The new version is aimed at professional program developers.

PolyAWK is a version of the Unix-based AWK language, which was developed at Bells labs in 1977 by Aho, Weinberger and Kernighan. Kernighan is probably better known for his development work on C with Ritchie. AWK is designed as a pattern matching language for writing short programs to do everyday tasks such as data formatting, validation, or searching for matching items. An AWK program is usually only a few lines long, and is made up of patterns to look out for, and actions to take when the pattern is matched. Many programmers notice a strong resemblance to C, which is probably understandable considering the background of both languages. AWK differs in lacking type declarations, and in having strings and numbers as built-in data types. Apart from this, a C programmer could probably look at an AWK program without noticing any great differences – in fact a casual glance would probably make you think it was C!

PolyAWK produces runtime versions of the programs developed, and no runtime license is required, so programs developed using PolyAWK can be distributed without worrying about royalty payments. It is available under either OS/2 or MsDos, and fully conforms to the standard described in the book *The AW K Programming Language*, by Aho, Kernighan and Weinberger, published by Addison-Wesley. Since the publication of the book in 1988 AWK has been enjoying something of a revival. The PolyAWK developers' Toolkit is available from TSCC price £175.

The intuitive Amiga

Amiga users will now have access to an Intuition-based database from Kuma. The database, while being simple to use, offers several advanced features such as variable length records, and buffering of data to allow multiple memory held datafiles. Called *K-Data*, the database runs under *Intuition*, Amiga's windows operation system. The database makes full use of the features of the operating system. Users can enter commands either via the keyboard or a system of drop-down menus. Prompts to show what is expected are shown, as are any error messages.

Datafiles can be merged or split, modified or sorted without any loss of data integrity. This allows users to develop their datafiles as their needs change without needing a complicated route. The sorts can be performed on multiple criteria, allowing fine control over the order of your data.

The two most impressive features of *K-Data* are the variable length records, and data swapping. The variable length fields is a feature normally only found on much larger systems such as *Advanced Revelations*. This reduces the amount of wasted space to almost nothing.

Data swapping is used to enable multiple datafiles in memory. Rather than limiting the user to the memory of the machine, *K-Data* uses a buffering system. When an item of data is accessed by the user, a whole buffer-full of information is loaded, with further disk accesses only being made if another item of data which is not in that buffer-full is accessed. This can speed up using the datafiles immensely when the task being carried out involves looking at records sequentially, but could slow things down if you were jumping around the datafile.

The price of *K-Data* is just £49.95 including VAT.

ACC Jumbo offers all in one

ACC has launched a combined fax, scanner, printer and copier in one machine at a cost of £1,245. The machine, called the Jumbo 400, uses the standard printer port. It is a standard CCITT group III fax, using standard fax paper and with a transmission speed of up to 9600 bps. As a scanner, the scanning resolution is 203 lines per inch horizontally by 98 or 196 lines per inch vertically. Documents up to 8.5" wide can be scanned.

Continued on page 32

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Continued from page 30

70 MHz CHIPS ON THE MENU?

The part of the computer industry making most noise at the moment is still the chip manufacturers. As predicted in earlier System Spots, Intel has announced detailed specifications of the 486 family of chips, saying production quantities of 25MHz chips will be available in the autumn of the year, along with samples of a 33MHz version. Most system suppliers, such as Sun, Hewlett Packard, Apricot, Dell, Compaq and Tulip intend to use the 486 in future products.

IBM has actually shown a PS/2 model 70 using a 486 already, by adding a daughterboard replacing the 386 and 387 (ie the numeric coprocessor) chips in the original machine. The machine was demonstrated to US dealers and press, and has been tested running Dos and OS/2. The machine showed a doubling in speed between the 25MHz 386 system and the 25MHz 486 system. It is not expected that the machine will be shipped until early in 1990.

While everyone else is getting excited about 33MHz chips, Hitachi has announced that it has developed the world's fastest bicmos processor with a chip operating at 70MHz. Bicmos processors are important to the current users of PCs because they are of a similar size to the chips we are using at the moment, but run much faster. The first transistors in common use were bipolar designs, so called because the designers visualised the transistor as having current carried by both positive and negative particles (holes and electrons respectively!) Bipolar transistors are fast, but building bipolar LSI chips is difficult because of their large size due to the use of three layers of silicon per transistor. Current chips use mainly mos (metal oxide semiconductors) devices. These are slower than the bipolar device, but simpler and smaller. While ECL or Emitter Coupled Logic devices have been available at speeds of around 100MHz for some years, they are much larger, and usually require some specially controlled environment to operate in; ie they are fine for mainframes but not PCs.

The Hitachi chip, which is designed to run in office computers without any special cooling systems will offer the performance of a mainframe in the size of a micro. The high speed is made possible by using mos transistors in 98 per cent of the 529000 transistors, but switching to bipolar devices where high speed is critical.

One of the problems of using high speed devices – 33MHz can be considered fast in this case – that has long been recognised by mainframe designers, is that care has to be taken over the design of the printed circuit board that the chip sits in. Possible problems can arise due to the tracks on the board acting like aerials. All tracks on boards act like aerials, but at low clock speeds this is not a particular problem. As the clock speed increases, the longer tracks are long enough to be close to an integral multiple of the wavelengths of the signal. They become very good transmitter/receivers, causing two problems. The first is that the signal sent from one end of the track is transmitted to who knows where (alpha centauri?), so that by the time you get to the far end most of the signal power has disappeared into the aether. Another problem is that signals radiated from other tracks are received by the track under consideration, muddying what little signal remains still further (this is called crosstalk).

This problem has been known for many years, and there are well-known solutions. One is to make the tracks coaxial, like a television aerial cable. This surrounds the cable so that the signal does not escape and incoming signals cannot interfere. A more common solution in printed circuit boards is to build the tracks using wave guide principles. Rather than having a single track, there are two tracks. One to carry the signal, and an earth track running close by in parallel to act as a sort of mirror for the signal pulses. This confines the radiated signal between the two tracks and guides to where it is needed. Because the radio waves given off by the pulse are kept within the waveguide, the signal loss is much less and there is much less interference from next door wave guides – hence no crosstalk.

The cure may be well-known, but few if any of the current generation of printed circuit boards in use in PCs use it. It does make the design of boards much more complicated, and up to now has not been seen as necessary. Some industry watchers have been raising questions about whether the current generation of boards can cope with running at the increased speeds of 33MHz without showing the occasional problem. The MCA (Micro Channel Architecture) of the PS/2 is one way of overcoming the problem, as it uses the sort of technique outlined above so that there is no deterioration of performance. Maybe we will all have to move to MCA if we want the speed and the total confidence in our machines, after all. In short – the chip may be able to run at 33MHz but can the printed circuit board?

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SIX OF THE BEST FROM HISOFT

British software house HiSoft has launched six new products at the recent European Computer Trade Show. The products range from C and Forth interpreters for the Atari ST to a Macintosh Emulator for the ST.

HiSoft C is a C interpreter for the Atari ST. This is good news for programmers who prefer an interpreter for their development stage, and the package is compatible with most common C compilers. Error messages given by the interpreter are clear, and error conditions automatically return the user to the editor.

Spectre128 is a full emulation of the Apple Macintosh on the Atari ST. It uses full-size Apple 128K ROM, so ensuring compatibility with new Mac software. Packages which, according to Hisoft, run without any patches include *Adobe Illustrator*, *Hypercard*, *PageMaker*, *MacWrite 5.0*, *MacPaint 2.0*, *Quark Express*, and *Aldus Freehand*. The system runs up to 20 per cent faster than a Mac Plus, with a 30 bigger screen. The emulator costs £129.95, or £199 including the ROM.

HiSoft Forth for the Atari ST or Amiga is a Forth interpreter with full graphics and floating point support. Other packages launched at the show include *Tempus 2*, a screen editor for the ST; *KnifeST*, a disk recovery tool; and *ProFlight*, a Tornado flight simulator/game for the Atari ST.

GLIMPSE OF THE FUTURE FROM NAG

NAG, the Numerical Algorithms Group, has recently launched *GLIMPSE*, a knowledge-based system for statistical analysis. The Generalised Linear Interactive Modelling + Prolog + Statistical Expertise package has been developed over the last five years as an Alvey project between NAG and Imperial College, London.

GLIMPSE is written in Prolog, and is based on *GLIM*, the statistical package marketed by NAG on behalf of the Royal Statistical Society. The new system has already been used in cancer research, and would be applicable to any problems requiring generalised linear modelling. Suggested areas include meteorology, medical research, agriculture, ergonomics or insurance.

The first version of *GLIMPSE* available runs on SUN workstations under Unix.

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VISITORS WELCOME - BUT BY APPOINTMENT

Spring COMDEX '89

by Paul Lavin

Lavin braves the Chicago snow and finds Intel making most of the flurries. ALR's PCs get their skates on and MACdex slips up

COMDEX blew into Chicago along with the first snow storm of spring, or the last one of winter, depending on how you look at it. Everybody bitched about the cold weather but when they get to Atlanta (the traditional venue) next June for the next spring COMDEX, there will be many reconsiderations.

Chicago's first and only (it seems) COMDEX had everything going for it: good exhibition halls within reasonable proximity of each other, good transportation, excellent accommodation, many fine restaurants and interesting after-hours entertainment possibilities. What it didn't have was a major product launch to whip up a feeding frenzy of media gurus, marketing sharks and pliable punters.

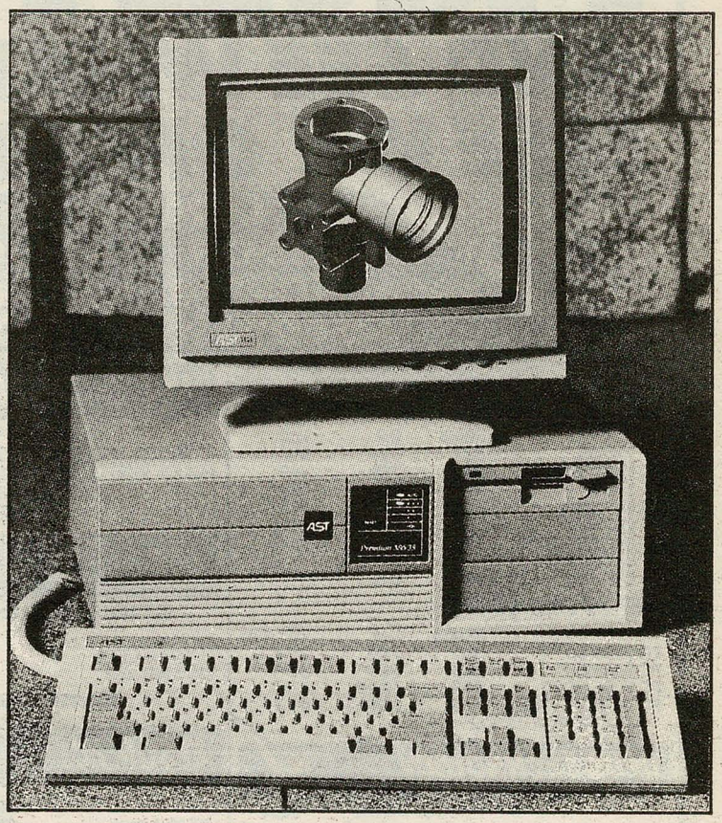
There was the Intel bash on Monday, however. Apart from this little do, there was nothing major afoot during the four-day show. The ramifications of Intel taking aim at the fattest part of Motorola's new line of Risc processors while maintaining compatibility with PC software was quite enough to stir the thoughts and pens of the industry mavens.

The press session starred Microsoft's Gates, Compaq's Canion, IBM's Cannavino, Borland's Kahn and some unknown from Lotus. The menu listed three courses. A CMOS 386SX, the 33MHz 386 renamed the 386DX and the long awaited 486.

Gates kicked off the guest speaker list with a demonstration of how even a 486 can be brought to its knees by OS/2 *Presentation Manager*'s processing overheads. The point was that the 486 was 386-compatible. Since OS/2 was written for the 286 and incorporates NO 386 specific code, it was a pretty miserable demonstration of 386 compatibility. Billionaire Bill promised OS/2 386 development system software for this year (only 240-odd shopping days to Christmas, Bill) and a rather open-ended promise for end users who live to see 1990.

The 486 has a Risc engine at its heart but is 100 per cent compatible with IBM software. Eventually somebody will work out how to optimise code and build in toggles to provide turbo boost when run on a 486. It won't really be needed, though, as the 486 runs 2.5 to four times as fast as a 386 at an equal clock speed anyway. Quick enough for you, John?

The 486 also has its maths coprocessor built right on chip, but the option of snuggling it up to an i860 was mentioned. There are eight Kb of SRAM and a cache controller, but it will still need an external controller and cache if you want all that it can give.



The AST Premium 386/33

The chip includes 1.2 million transistors which Intel's founder, Andy Grove, says are cheaper than jelly beans. He figures that you can get nine transistors per jelly bean. That means that a 486 should cost about 133,000 beans. If each bean is worth 0.4p each, it works out about right.

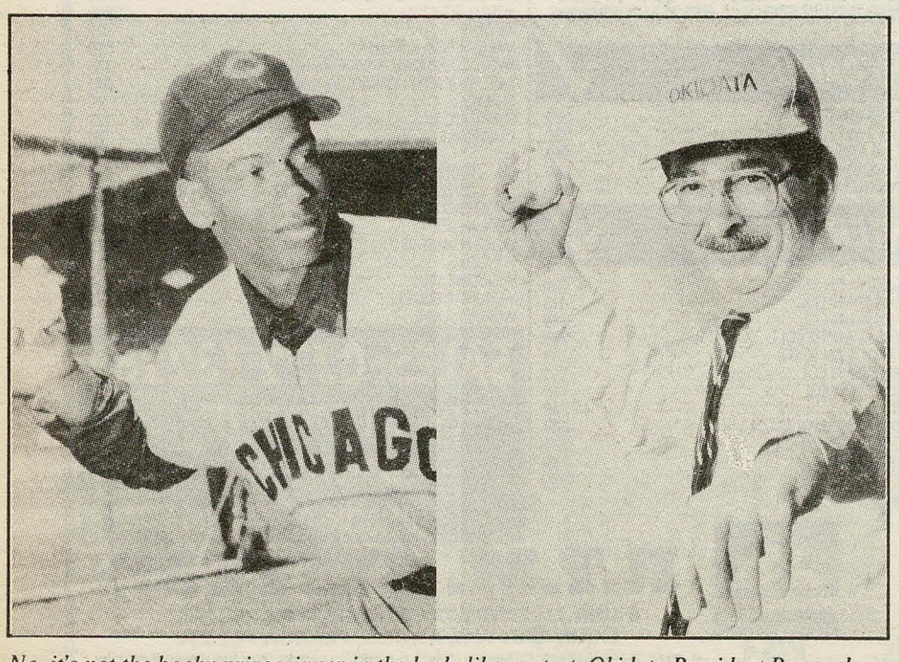
If you've got an inside line on some cheap jelly beans, talk directly to Grove at Intel in San Jose – maybe you can cut a good deal. Don't call me. The 486 costs about triple what the 386DX does. Intel speculated about 486 boxes costing less than $10,000, all dressed up and ready to go.

The 33MHz 486 will be available in the fourth quarter and a 40MHz version maybe next year. A 50MHz version was mooted. Implementation in buyable kit will be delayed until delivery of the external cache controller and other bits and bobs unless somebody does a quick and dirty and settles for merely twice the speed of a 386. The now lowly 386DX is said to be available immediately.

In the Q&A session at the end, one scribe nerved himself up to ask why IBM and Compaq were not in the list of PC makers committing to near term availability of the 33MHz DX. Cannavino turned to Canion and said, sotto voce (perhaps due to his Italian heritage, otherwise it would have been a stage whisper), "Shall I take it or will you, Rod?" A clear answer was not forthcoming from either of those august personages.

The Intel 'public' (ha! admission by ticket only – and they checked Vittorio Cassoni's at the door) presentation was slick. They invoked the spirit of the HAL 9000 and Dave Bowman (last seen in orbit sans spacesuit) to chronicle mankind's prickly relationship with computers: "Open the pod bay doors, Hal." (Silence while the computer thought "Piss off, Dave").

The quadrophonic soundtrack



No, it's not the booby prize winner in the lookalike contest. Okidata President Bernard Herman (right) scrapes the bottom of the photo opportunity barrel with the help of baseball celebrity Ernie Banks

Continued on page 38

and light show were little short of fantastic. It was probably as close as most of the suit-and-tie straights in attendance will ever get to taking drugs. They ate it up.

The Intel announcement also listed a number of PC makers committed to the 386DX. There was Olivetti, which had a running M380 XP9 at the show; ALR, which had two models on display, plus Acer, Zenith, Everex, Altos, AST and Tandon to name-drop a few.

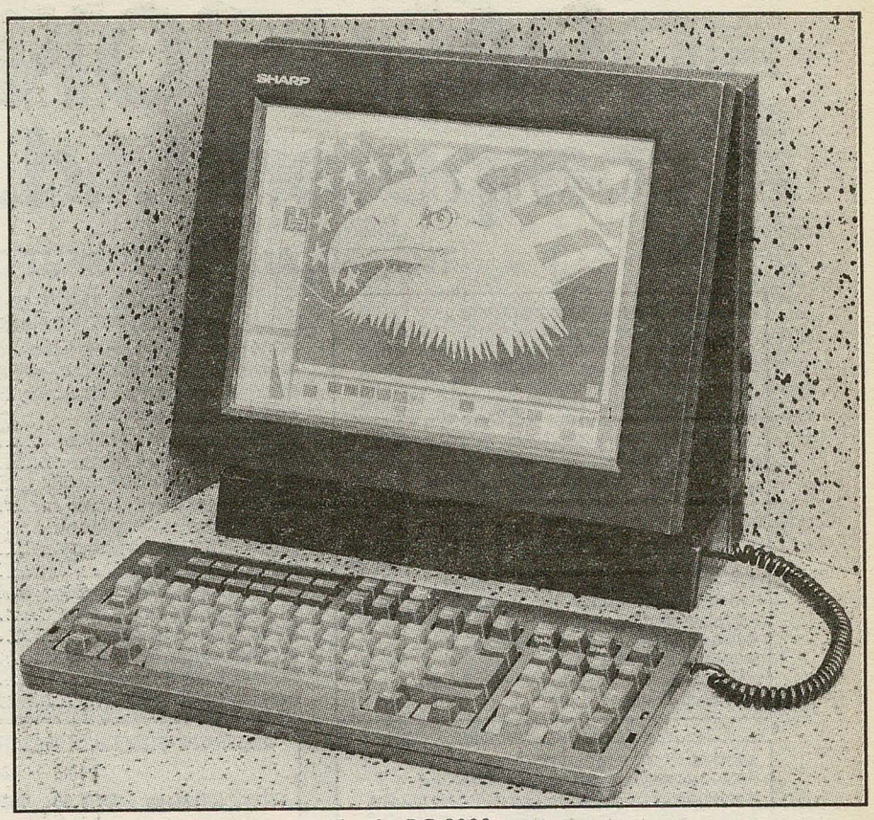
Ah, Compaq, wherefore art thou? Compaq didn't even turn up for the show, although Intel did show a slide of the EISA chip set to rally the faithful. Show me an EISA machine with an Intel i860 running the same demo that IBM had with its MCA/i860 combo in February and I'll personally eat a copy of *Computer Shopper* in front of Rod Canion. Offer expires 31 December 1989.

SOTA and AOX are getting ready to provide 32 bit software compatibility for the masses with add-in SX cards. SOTA's was for the PC bus, along the lines of that low-budget thriller SOTA is currently hawking to Amstrad owners who want a 286. AOX's offering does the trick for PS/2 Model 50 and 60 owners. AOX also has a little sandwich plug-in for 286 machines under development which includes a cache and, strangely, a 40 MHz crystal.

Dell and Tandy launched SX machines. Wait six months for the inevitable price adjustments.

Daewoo's SX-powered MCA compatible was not what it appeared to be. The genial sales/marketing airhead chaperoning my inspection of the beast assured me that there was a 386SX chugging away inside. Norton told me that it was a 286. Who should we believe? Sorry, it was not possible to undress the machine in public to resolve the discrepancy.

Daewoo was also showing a slick set of laptops that went from an uninspiring 8086-based T1200 workalike to a lighter-than-SLT, battery powered 286 and the first battery powered SX. The SX will undoubtedly incorporate Intel's latest CMOS chip for extended play before full scale production is realised. No prices were available, mostly because Daewoo is looking to OEM them to somebody else for marketing.



Sharp's colour-LCD VGA portable, the PC-8000

Okidata sponsored the Okidata Modem Ice Sculpting Contest – "a unique pairing of technology and art" – to the bemusement of those in attendance. Firstly, it's a little hard to posit a link between computer telecoms and poncy French chefs chipping away at blocks of ice. Secondly, the competition wasn't even in the COMDEX Hall or, indeed, even in one spot.

Thirdly, the $1,000 prize and, presumably, the honoraria for the distinguished panel of judges, represents the worst-ever value for money publicity for a computer peripheral since the creation of press agents as an inferior sub-species of Homo Neanderthalus. As a non-event it was bested only by MACdex.

MACdex was a farce. At last fall's COMDEX, it was just a room off to the side with a score of Mac vendors skulking around. The big coming-out party was to have been here at Chicago, but it fizzled badly. Apple, the nominal beneficiary of all this Maccitement, was nowhere to be found east of Cupertino. Maybe the law suit by Apple Corps. was seriously draining their resources. Go get 'em, Paul, George, Ringo and the heirs, successors and assigns of John!

Plans to charge an additional 10 dollars admission for MACdex were quickly scrapped. Even so, the dozens of exhibitors outnumbered the attendees. It could all have been predicted. There are already four major Mac shows in the US; a Mac appendage to a show that has, in recent years, become an IBM PC compatible spotlight was about as useful as tits on a boar hog.

But the MACdex debacle did allow me to get my first – and Spring COMDEX's only – look at Jobs' NeXT machine. It was big, black and running a demo. What else can I say? Hands-on doodling was strictly discouraged. Just how Panamax, a mains surge protector company, got their hands on it I am not entirely certain.

In the bowels of the middle of the East Hall, buried in the middle of the cabling and uninterruptable power supply brigade was Powder Blue Computers with their Mac clone, the BlueMAQ – BIOS ROMS bought from Apple. Powder Blue says it's cheaper, it's compatible and there are no legal problems, and is touting the BlueMAQ's PC-like box. I say good luck.

Wang pulled its finger out and finally launched the LAN version of Freestyle. Without a LAN as a framework, Freestyle didn't make much sense. Now it should make a lot of sense for people trying to get value out of the LAN some fast-talking dealer entangled them in.

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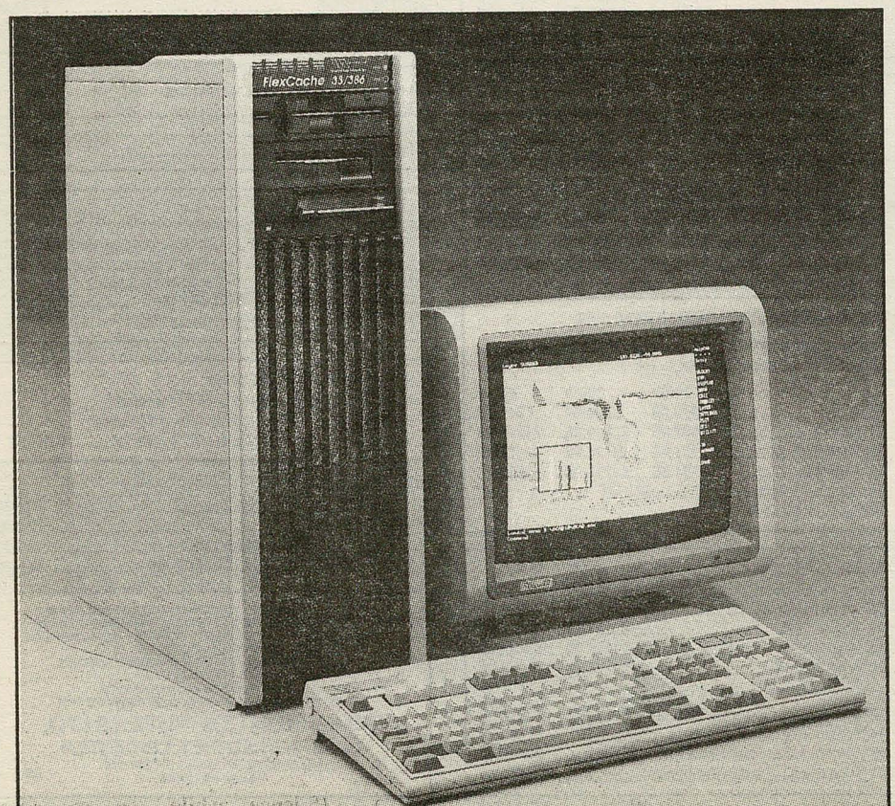

ALR's Flexcache 33/386. ALR's tower boxes can take 16Mb of SIMMS on their motherboards

Continued on page 38

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	20Mb	30Mb	40Mb
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PC1512 S/D Colour	£675.00	£689.00	£759.00
PC1640 S/D Mono	£679.00	£699.00	£775.00
PC1640 S/D Colour	£789.00	£799.00	£869.00
PC1640 S/D ECD	£869.00	£889.00	£969.00

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PC1512 D/D Mono	£659.00	£679.00	£709.00
PC1512 S/D Col	£659.00	£679.00	£709.00
PC1512 D/D Col	£749.00	£769.00	£799.00
PC1640 S/D Mono	£679.00	£699.00	£729.00
PC1640 D/D Mono	£749.00	£769.00	£799.00
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The above prices include FREE AMSTRAD DMP3250 PRINTER

AMSTRAD PC2286

	D/D	40Mb
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14" High Res VGA	£1214.00	£1529.00

AMSTRAD PC2386

12" Mono VGA 65Mb Hard Disc	£2384.00
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AMSTRAD LQ5000, 136 col, 288 cps, 96 lq, 24 pin	£349.00
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EPSON FX1050, 136 col, 240 cps, 48 nlq	£408.00
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EPSON DFX5000, 136 col, 533 cps, 80 nlq	£1158.00
EPSON TLQ4800 132 col 250 cps 83 lq, 48 pin	£1549.00
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CITIZEN MSP15e, 136 col, 160 cps, 40 nlq	£199.00
CITIZEN MSP40, 80 col, 240 cps, 50 nlq	£234.00
CITIZEN MSP45, 136 col, 240 cps, 50 nlq	£259.00
CITIZEN MSP50, 80 col, 300 cps, 60 nlq	£299.00
CITIZEN MSP55, 136 col, 300 cps, 60 nlq	£324.00
CITIZEN HQP40, 80 col, 200 cps, 66 nlq, 24 pin	£375.00
CITIZEN HQP45, 132 col, 200 cps, 66 nlq, 24 pin	£329.00
STAR LC10, 80 col, 120 cps, 25 nlq	£169.00
STAR LC10 Colour, 80 col, 120 cps, 25 nlq	£219.00
STAR LC24-10, 80 col, 170 cps, 57 lq, 24 pin	£299.00
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STAR NR15, 136 col, 240 cps, 60 nlq	£429.00
STAR NB24-10, 80 col, 216 cps, 72 nlq, 24 pin	£449.00
STAR NB24-15, 136 col, 300 cps, 100 nlq	£549.00
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NEC P7+, 136 col, 265 cps, 90 lq, 24 pin	£575.00
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BROTHER 1709, 132 col, 240 cps, 50 nlq	£349.00
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Qi 350i, 16 MHz, 2 Mb RAM, 47 Mb H/D	£2390	£2670
Qi 350ti, 16 MHz, 2 Mb RAM, 47 Mb H/D	£2780	£3050
Qi 650, 20 MHz, 1 Mb RAM, 47 Mb H/D	£2850	£3120
Qi 650t, 20 MHz, 1 Mb RAM, 47 Mb H/D	£3220	£3490
Qi 660, 25 MHz, 1 Mb RAM, 65 Mb H/D	£3290	£3570
Qi 660t, 25 MHz, 1 Mb RAM, 65 Mb H/D	£3670	£3940
Qi 660i, 25 MHz, 1 Mb RAM, 118 Mb H/D	£4040	£4310
Qi 660ti, 25 MHz, 1 Mb RAM, 118 Mb H/D	£4410	£4680
XEN-S 386SX	Mono	Colour
XEN-S PC 30 Mb H/D 3½" Drive	£1580	£1860
XEN-S 210 3½" Drive	£1570	£1850
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Continued from page 35

an address book icon found on the PopUp Freestyle desktop. It really looks quite painless. It is a tad expensive (a 286 PC, with tablet and voice doo-hicky starts at 7,000 US bucks). Upgrades for existing PCs are available.

Data General really brought me up short with its 88000 based workstation. For $7400 you get four Mb of RAM, a 16MHz chip, integrated Ethernet, SCSI controller, a 20" mono monitor giving 1280x1024 and a mouse port among other things. Not a bad little package. $£500 per MIP would be cheap if only you didn't have to write your own software for it.

Distributed Processing Technology, known for the caching hard disk controller board that could make an Amstrad 1640 run like a dedicated Novell file server, had its latest development out in front of God and everybody else: disk mirroring in hardware. If your life is on that disk, don't screw around. Get one of these sent by Federal Express. Don't forget a UPS, too.

The American distributor for a French company called Memsoft showed a multi-user add-on for OS/2. Terminals could be ASCII terminals or PCs with terminal emulation software. This brings (text mode) OS/2 down to PC level. Neat.

I took advantage of the free Logitech Mouse watch offer and cruised their stand. Logitech has got a new low-cost mouse called Dexxa (perhaps calling it the Mini Mouse would have brought a writ from Disney). They were also showing a resculptured, low profile opto-mechanical mouse and a hand scanner, ScanMan. If *PM/OpenDesktop* takes off, the mouse business will be one of the first beneficiaries. In fact, they might get more out of it than most users.

Mission lucked out and got a mega stand right next to IBM, despite this being its first COMDEX. Mission was showing its office in a briefcase ProPortable and a fileserver that could have easily been mistaken for the monolith in 2001.

The 20 pound ProPortable is a 25MHz 386 with two MCA slots, a VGA plasma screen, a Diconix printer, big magnetic and optical SCSI drives and a mains lead. When this momma gets out onto dealers' shelves, watch status sales of the Tosh T5100 plummet. Fax, modem and telephone (cellular, certainment!) interconnections are coming next. Design by Porsche. Phone your mortgage lenders now.

Mission's bedmate, ALR, was fast off the mark with its 33MHz (oops, sorry, 386DX) desktop and tower designs. The desktop with one Mb of RAM and a floppy will probably sell for about £2,500 in these parts. ALR was talking immediate availability on its stand until I said "OK, I'll have one" and whipped out my gold card.

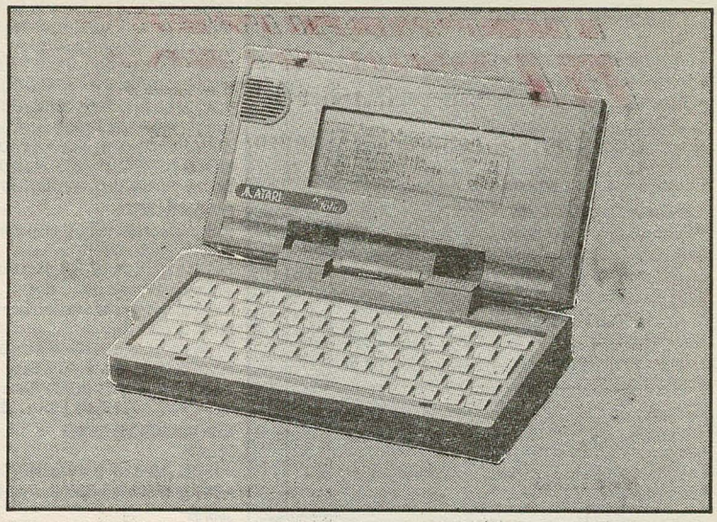
Access could probably best market its credit facility to PC buyers by saying "When the gold card drops, the bullshit stops." After a bit of backing and filling (not to say shucking and jiving, humming and hawing, also known as bullshit), immediate delivery stretched into May.

The ALRs are the fastest PCs that I ever stuck Norton's SI into, but ALR has severely blotted its copybook with the proprietary memory cards used in the desk top machine. Having recently waited five weeks for Compaq to deliver on its home brew memory boards, I wouldn't care to find out how long anybody else's supply lines are. From now on its SIMMs or forget it for me and my PCs. ALR's tower boxes can take 16 Mb of SIMMs on their motherboards.

Xircom has a little something for the laptop user that has everything: a pocket sized Ethernet adaptor. With lots of serious money being spent on power laptops, a means to get them plugged into the office network was needed. The 14 ounce package plugs into the laptop's parallel port and then into either thick wire Ethernet or cheapernet cabling. Drivers for Novell Netware 2.0 and 2.1 are included.

The standard model has an eight Kb buffer, but 32 Kb of RAM is optional. Said to operate a 10 Mbits per second, the Pocket Ethernet Adapter is also an answer to desktop workstation users who find themselves a slot short.

Atari showed the Folio pocket PC. It was a good thing that everyone seeing it didn't yawn at once or the windows would have imploded



The Atari Folio. Pocket-sized it may be, but it won't get very far unless Atari comes up with some software

WordPerfect unveiled its text mode OS/2 version, a scant year after the public availability of the version 1.0 of the operating system. What a shame that we will have to wait at least another year for some *PM* software from the word processor giant killer. This is a great opportunity for some little known WP company to get in there and do unto WordPerfect what they did unto Wordstar.

The *WP 5.0* for OS/2 was largely indistinguishable from the DOS product and I suppose that this is a good thing. Two megabytes minimum are required if you run it under version 1.0 but another meg is needed if you want the *PM* front end for task switching. If only WordPerfect's parties were as good as its software. Diet coke and pizza? Come on, guys.

Number two and trying harder is Wordstar. Its soon-to-appear version 5.5 has SAA-compatible pull down menus, conversion utilities, text and graphics integration and an amnesty/upgrade for owners of borrowed copies.

Speaking of OS/2 software, Micrographix, of *Designer* fame, launched version 2.0 and bundled a *PM* version in with the *Windows* version FREE! Current *US Designer* users can upgrade for £99. Sounds like the deal of the year to me. You'll need all that money you save to buy more RAM.

Atari showed the Yanks the Folio pocket PC. It was a good thing that everyone seeing it didn't yawn at once or the windows would have imploded. As your therapist tells you, it's not size that counts. The PC got where it is today by offering software to suit all sorts. If Atari wants the Folio to take off, we had better see some soft stuff soon. Not to mention more hardware than the tired exhibition special Atari has been showing around.

The Computer Giftware Co provided what might be the product triumph of the entire show. Among all the products available Real Soon Now, it was nice to see stuff you could actually buy. The Computer Giftware Co has got designer mouse pads and bar mats that look like 3.5" floppy disks. Given the number of coffee mug rings seen in close proximity to PCs, this product will probably be in more demand in 1989 than *PM* or Unix for Atari Folios.

Well, that's about it for the Interface Group's rites of spring except for the list of no-shows for your contemplation: Microsoft, Informix, Apple, DEC, Sun, Seagate, Convergent and, last but not least, the champions of the EISA bus, Compaq. Is it 'Fortuna juvat audaces' or 'Diminimus non curat COMDEX'? I forget which. See y'all in Las Vegas in November.

It was a 'colourful' COMDEX. Everybody and their cousin had colour portables on display, none of them with price tags or delivery dates. Sharp showed the PC-8000 386 luggable, as it did at Hanover, and all were impressed from Tuesday onwards. On Monday the only working box this side of Osaka was decidedly under the weather. I would wager that some (Sharp) body had an unexpected duty free shopping opportunity at Anchorage bringing in the spare.

An IBM/Hitachi colour technology demonstration was in evidence, as was a Toshiba T5200 which, in addition, demonstrated Tosh's new four Mb SIMMs. A laptop with 14 Mbs – get serious! Fall COMDEX will probably hear the first tall stories about when and how much.

Paul Lavin is rumoured to wangle more free hotel bedrooms than the entire cast of Crossroads

H T COMPUTERS

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Extending the 286

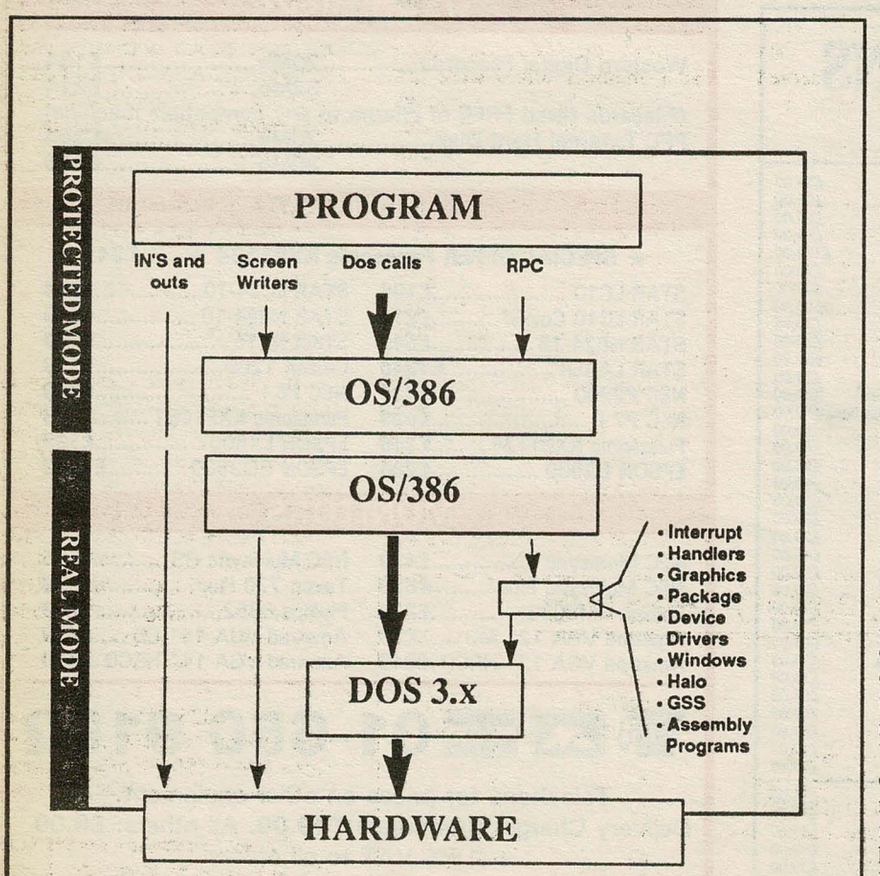
by Larry Choy-Kee

Breaking the barriers for Dos. In the first of two articles Larry Choy-Kee looks at Dos extension technology and the hype that surrounds 386 machines and OS/2

A NEW era for Dos may be unfolding with the introduction of software and hardware Dos extensions.

These products break the 640k barrier and permit Dos applications to run in protected mode. They offer developers and end users the familar user interface of Dos while enabling code designed for real mode 640k memory models to be adapted to the protected mode (80286/16 MB or 80386/4GB) memory models of 80286 and 80386 processors. These memory models are contiguous memory, without the limitations of swapping found in programs using EMS memory. In their simplest form, Dos extenders will require an extended memory board which will be seen as a contiguous block of directly addressable memory by the intended Dos application. The intended Dos real mode application is then recompiled to take advantage of this larger memory space where it is loaded. The Dos extension software mediates and controls Dos function calls and interrupts from the new protected mode program. The protected mode extensions allow the user to switch between the protected mode applicaion and normal Dos applications. This is called 'protected mode real mode switching'.

This effectively permits most of the standard Dos 640k environment to be preserved for the user's usual Dos applications and TSR programs while a protected mode program runs separately in extended memory. Dos extenders allow applications which cannot utilise EMS memory because of speed constraints or space. They provide a large, fast, directly addressable memory model.



AI Architects' OS/286 or OS/386 allows full access to all BIOS and Dos services. The RPC(Real Procedure Call) permits proprietary graphics interfaces to run in the protected mode space. Direct support is supplied for media cybernetics (HALO) and Microsoft Windows 386.

AI Architects

Dos Extenders and Hummingboard

AI Architects offers its Dos extender operating system add-ons OS/286 and OS/386 for systems with those main processors. These are not end user products, but tools for software developers to build protected mode applications. The advantage for the developer is not having to learn a new operating system environment. This translates into real savings in time and money. Compilers, utilities for Lattice C, Metaware C, Lahey FORTRAN, PASCAL and linkers (*MS-LINK* and *PLINK86*) all working in protected mode. This is in addition to assembly language.

The following list covers most of salient features of these products:

BIOS services
Complete access to BIOS services from protected mode applications. This includes video (INT 10), keyboard (INT 16H), RS232 (INT 14H), and diskette (INT 13H) services, among others.

Memory management
An application can define a segment that overlays any region of physical memory, including screen memory buffers, BIOS tables, and memory-mapped I/O devices. Protected mode programs under OS/286 and OS/386 and compatible with other programs using protected memory, including VDISKS and disk caches. Applications may be loaded starting at any address in high memory. The lower 640K can be left free for networks, TSRs, etc, or dynamically used by protected mode applications.

Extended segment services
A code segment can be aliased and then used as a data segment or vice versa. In addition, a window can be defined on any segment, can be extended or shifted, and can support child windows. With this facility, a new stack segment, for instance can be defined within a data segment.

Real/protected mode communications and transfers
A protected mode application can issue an interrupt to a real mode interrupt handler, effectively allowing a protected mode application to communicate with real mode TSRs. The RPC feature enables transfers between real and protected modes.

Traps and exceptions
An application can intercept any protected mode trap or exception for internal handling.

Hardware interrupts
A protected mode application can gain control of any hardware-generated interrupt, effectively allowing device service routines to use the full capabilities of the 386. Chaining to a real mode handler is also supported.

Direct screen writes
An application can write directly to the screen by creating a segment that overlays the video buffer memory (or by mapping a piece of a segment to overlay the screen) and then using this segment to read and write the screen memory directly. These are a few of the most important features which these products offer. The base system requirements are:

- 1 MB of extended memory
  Low memory kernal requires
- 64kb while application is running.
- High memory (above 1MB): less than 64K bytes used by OS/386 kernel.
- Shareable between applications and VDISK.

Coupled with Dos extenders, AI Architects offers a 386 add-on board which can run in parallel with your main board processor. The board offers parallel processing with your main board processor. This is true multi processing, the price of $1,600 US for the

version with the minimum amount of memory. Processors available will run 16, 20, 25 MHz speeds. This beats OS/2 by miles if you have a dedicated application which is processor intensive. A user BBS system is available with code examples and demo's.

Contact
A.I. Architects INC
One Kendall Square,
Cambridge, MA. 02139 USA
(617) 577-8052

The 80386 con

ADVANCED Micro Devices has recently introduced its AMD 80286/16. This processor will run 10 per cent faster than Intel's 80386sx, and 5 per cent faster than Intel's 80386/16 running at 16 MHz. This is based on both chips running in real mode using the same clock speed, 16 MHz. The AMD chip costs approx 85 per cent of Intel's 80386sx chip, the cheaper of the 386 chips, in single price quantities.

Chip pricing
The following prices are what you would expect to pay for a chip in the US. Listed below are unit prices, but obviously bulk buyers can take advantage of discounts. The range of discounts available can be calculated as follows: Quantity 100 = 10-15 per cent off;Quantity 1,000 = 20-25 per cent off; Quantity 10,000 = 30-40 per cent.

(Chip type/Speed in MHz)

80286/10 – $190.00
80286/12 – $212.00
80286/16 – $250.00
80286/20 – $301.00
80286/25 – ?JUL/89
80386SX/16 – $370.00
80386/16 – $290.00
80386/20 – $390.00
80386/25 – $430.00

These prices are only approximate, and it should be borne in mind that were you to attempt to buy them in the UK they would be considerably more expensive.

The delivery of the AMD 25 MHz 80286 chip is scheduled for mid 89 (June or July). The speed increase is achieved by internal design changes to the cmos chip. This will be closely followed by the release of AMD's 20 MHz 80287 math coprocessor part.

Q: Do the AMD and Harris 80286 offer the same performance as Intel's 80286?.

Ans: Harris and AMD have both released speed benchmarks substantiating their claims of greater speed. These benchmarks are freely available from the two companies.

I believe Intel may have equally fast 80286 chips, but has not released them to preserve the benefit of its 80386 (high price) chip set. Intel's 80286 (lower price) chip has been rated at 12 MHz for two years. It seems clear that Intel, AMD and Harris can produce chips using 1.5 micron design rule (greater component density = smaller faster chip). This is probably the reason for the speed increase of AMD's proposed 25 MHz 80286.

REAL AND PROTECTED MODE EXPLAINED (OS/2 vs Dos)

The 80286 and the 80386 have two primary modes of operation; real and protected mode. In real mode these processors execute code as a fast 8086 processor. The protected mode is the native (real) mode of both 80286 and 80386 processors. The protected mode allows both processors to take full advantage of all the new features each has. These features permit greater facility in managing large memory configurations. These features presumely encourage multi-task operation of the the processor. Multi-tasking suggests that is possible to run several programs serially, giving each a slice of time to use the processor. This makes it appear that the execution of all the programs is occuring simultaneously. This mode of operation is what OS/2 is really about, and what it offers the user.

These new operating systems will use the protected mode in their normal operation. They require a very fast 80286 or 80386 and a large (4 MB+) fast memory and a fast hard disk to make response time in this environment acceptable. Clearly there are many situations which require this type of environment. Shared multi-user systems, and realtime data acquistion must be served quickly by this type of operating system.

The average user has their hands full running one program at a time. The OS/2 environment would need a user who would startup three or four programs. Such a user would have the mental agility to jump between the programs and remember what he were doing in each program. That is not your average user. This environment would be very helpful for multiple batch jobs which can run unattended. More than 95 per cent of all programs written for the PC run in real mode and cannot take advantage of the extended features of the 80286 and 80386 chips yet.

Software developers develop programs for the majority. The alternative for software developers is to support and maintain two versions of each product. No developer can afford to support a program which has only marginal sales. The majority of users still have an 8088 80286 or a NEC V20 OR V30 not an 80386. As long as 80286 and 80386 systems are in the minority, very little software will be written for protected mode. This also means if OS/2 was bug-free and completely ready, few people would want it, or need to buy it. The base cost of entering the OS/2 club is about £1,500.

At the time OS/2 was concevied, memory prices were low. OS/2 needs large memory systems to be of any real value. The price of memory is a limiting factor in the use of OS/2. Companies will adopt OS/2 with the hope of greater productivity. The use of LANs (Local Area Networks) in offices will get a boost from OS/2. Single user systems which use OS/2 version 1.0 will probably be the programming community which supply OS/2 programs. Finally, in about 2-3 years, when everyone who could afford a £1,000 operating system has bought one, the price will drop with hopes of increased demand.

Since most people usually run no more than two programs at a time, using MsDos 3.3 is more efficient in its use of memory than OS/2 which is a larger more complex system. Those of you who enjoy looking through windows will be interested in *Desqview* (£98.25 plus VAT from Corporate Software on (07357) 5361) if juggling several programs at once is your forte.

Desqview uses EMS memory and is a Dos extender within the framework of program and data swapping between EMS memory and the base 640 kb of the system.

Desqview, and all programs which use EMS memory, uses a 16 kb buffer or series buffers in the main 640kb to transfer and retrive code or data from EMS memory. These programs run in real mode exclusively not protected mode.

A 80286/80386 BENCHMARK
AMD has stated that Everex Systems' Step 286-16 is faster than, or equal in speed to, Compaq's 386s (with the Intel 80386sx processor), and IBM's PS/2 model 80 (with the Intel 80386) in benchmark tests. The benchmark was conducted at the Fall COMDEX computer show in Las Vagas, Nevada. The machines listed above were used for the benchmarks. It consisted of Norton si test, Landmark test, PC TECH benchmark and running the following programs:

1. Paradox
2. OS/2
3. RBASE 5000

It was not made clear if this is also true of the OS/2 operating system. Only MicroSoft knows for sure if more 8- and 16-bit instructions occur in its OS/2 code. This would be ironic; OS/2 might run on an 80286 more efficently than on the 80386. As it turns out OS/2 DOES NOT RUN IN NATIVE 80386 MODE! OS/2 runs in 80286 emulation mode on the 80386. This means OS/2 in 1989 runs faster on the 80286 than the 80386. This is the current version of OS/2; future versions (1990-1992?) will probably fully support the 80386 32-bit design.

The test seems to reveal that the code used in programs 1 and 3 contains more 8- and 16- bit short instructions than 32-bit instructions. This is the primary reason for the poor showing of the 80386 chips. The results are shown in the figure 'Fall COMDEX Bench Tests'.

Fall COMDEX Bench Tests

Instructions	80286 clocks	80386 clocks
CBW convert Byte to Word	2	3
CLTS Clear Task Switched Flag	2	5
DAA Decimal Adjust after add	3	4
LMSW Load Machine Status Word	3	10
LTR Load Task Register	17	23
MOVS Move Data from string to string	5	7
POPA Pop all General Registers	19	24
RCL Rotate byte left through carry	2	9

A sample of instructions that require more clocks on the 80386 than on the 80286.

According to Harris, out of 190 instructions tested, 74 instructions execute faster on the 80286 than on the 80386. Of the remaining instructions 66 executed at the same speed and 50 were observered to execute faster on the 80386.

DOLLAR TRANSLATIONS

Most 80286 systems are in the £1,000-£2,000 range; the clone 80386 systems overlap the higher end of this range. The IBMs and Compaqs do not, they are in the £3,000+ range. The portion of the price of a system which the processor seems to represent is not tangible, but identifies the system as a particular class of machine.

Notice the 80286/20 and 80386/20 are separated by less than £100. Yet systems, almost identical except for the brand name and the processor specification, can be separated in price by more than £500 to £1,000.

Marketing hype creates a perception of value which is often an illusion. Like beauty, the illusion of value is in the eye of the beholder. A careful analysis of the real service a company can provide, if service is what the buyer really needs can save hundreds or thousands of pounds. Most individually owned micros used carefully, require very little service over their approximate five-year lifetime. Cost added to a micro for service amenities a company has projected it will deliver are often not used.

This is bonus money a company earns when its prices are high and machines solid. Though even cheap micros are amazingly rugged because their system components are modular. Generally, the standard of components and board assembly are very good. Paying for the name is not always the best move, and it is often up to you to make the most of your system's capabilities.

Next month

In part two of this article we look at the implications of Dos expansion technology, and suggest various ways in which you can exploit the latest developments. How to beat the memory and price barriers, and how to make sure that you are in the right place in the 1990s.

The History of Intel chips

Intel 80 series Microprocessors

8080 – 8 bit bus 64kb address space
8085 – 8 bit bus expanded instr 64kb address space
8086 – expanded instr 16 bit bus 1Mb address space
8088 –8 bit bus
80186 –16 bit bus expanded instr
80188 –8 bit bus
80286 –16 bit bus 16 Mb address space
80386 –32 bit bus 4 Gb address space
80286/16 –16 bit bus 16 Mb address space
80386/16sx –16 bit bus 16 Mb address space

The 80386sx is Intel's response to the faster 80286 processors of AMD/Harris. The 80386sx has to multiplex its 32-bit wide data bus to the smaller 16-bit wide data bus.

This would be fine if the level of performance were not affected. This slows the SX in ALL modes of operation and is self defeating. It compounds the overhead which all 80286 and 80386 processors incur when running in multitasking (protected) mode.

Address multiplexing cripples the 80386 architecture. A more apropriate step would be to have given Intel's own 80286 an on-chip data cache. This is what all of the Intel microprocessor line have lacked. The Motorola 68000, and the Fairchild Clipper have onboard caches. It's not too late for Intel to add the Cache to 80286. Let's hope an on-board cache is one AMD plans for boosting the performance of its 80286.

Larry Choy-Kee is a programmer and engineer living and working in the United States

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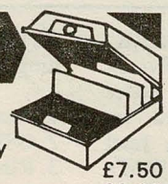

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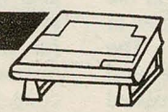

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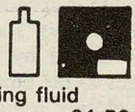

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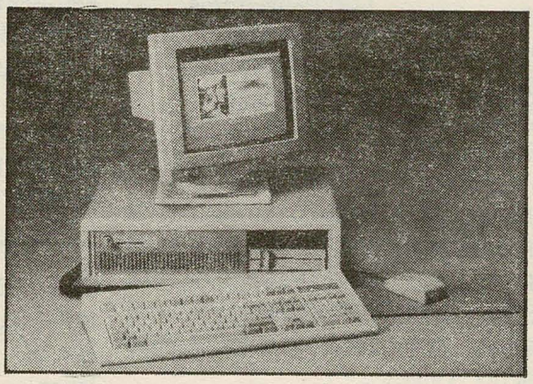

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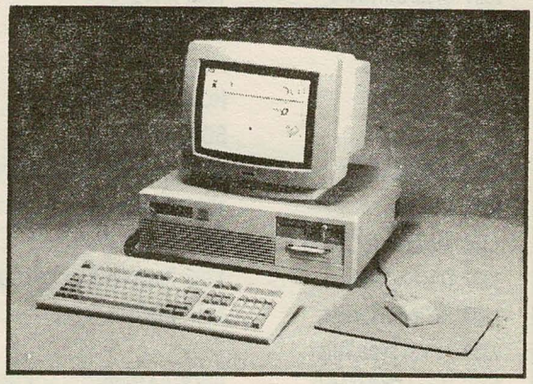

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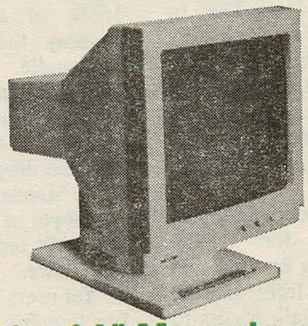

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Getting the most out of Dos

by Terrence M Colligan

Can Dos survive the onslaught of OS/2 and UNIX? Terrence M Colligan, President of Rational Systems, believes it can with the help of Dos extension technology. Beating the 640K barrier

IN THE eternal search for faster, more powerful personal computers, we often look to the next generation for answers. Often the solution is already on our desktops.

The migration from Dos to OS/2 is a perfect example of this phenomenon. Daily, users are barrged with claims stating that OS/2 may someday overtake Dos as the operating system of choice. In reality, Dos is alive and doing very well.

Dos is still the dominant operating system for PCs. Unfortunately, users are told that they must change from Dos to OS/2 or UNIX to gain access to the most powerful software applications. Very few of these promised powerful applications – especially OS/2 applications – have been delivered. The ones that are available are surprisingly similar to existing Dos programs.

But software vendors can provide advanced applications that take advantage of existing 80286 and 80386-based PCs by taking Dos beyond its standard limits. By using 'Dos-extenders' vendors can break the 640K bytes of RAM barrier imposed by Dos and give users the larger, more powerful programs they demand.

In order to understand how Dos extenders work and their benefits for the user, it is important to review the history behind the Dos memory crunch.

When the IBM PC was first introduced in 1981, 640K provided a great deal of memory, 10 times what the state-of-the art products were offering. MsDos, designed specifically for the Intel 8086/8088 microprocessor in the IBM PCs soon became the operating system of choice for business microcomputers.

Three years later, IBM introduced the AT-class PC, based on the Intel 80286 microprocessor. The 286 chip runs in two modes: In its native mode (called protected mode by Intel), the 286 chip supports multi-tasking, virtual memory sytems such as UNIX and addresses up to 16MB of physical memory. In 'real' mode the 286 provides complete compatibility with the earlier 8086/8088 microprocessor, making it easy to run Dos, but limiting program and work space to 640K.

Similarly, although 386-based PCs also can run in real or protected mode, Dos applications are still limited by this 640K barrier. Unitl recently, there has been no way under Dos to access the full 16Mb of addressable physical memory that current machines can handle.

At the same time that Intel has introduced more powerful microprocessors, the cost of memory has also dropped. Most PCs now come standard with at least one megabyte of memory, but, under Dos, still only 640K is available to the user.

Yet users are demanding more functionality and larger workspace, placing more pressure on software vendors to overcome the memory barrier. With more powerful PCs available but limited useable memory under Dos, software developers are faced with trying to find solutions to practically impossible problems.

Figures 1, 2 and 3 illustrate this point. In a standard 286-based PC with 1MB of memory, there is 640K of useable memory. Dos uses approximately 70K, leaving 570K available. For earlier programs or small applications, such as *Lotus 1-2-3* release1.0, this is plenty of space. For later versions or larger programs, such as *Lotus Symphony*, there is still ample room, but the effective workspace has been reduced. For larger programs, especially mini or mainframe applications ported to a PC, there is not enough space to run the program or making undesirable compromises, such as removing features.

In addition, most users also take advantage of the large selection without RAM-resident programs available, such as Sidekick, a desktop organiser. These Terminate and Stay Resident (TSR) programs also must fit into the available 640K bytes of memory. Each TSR effectively increases the size of the Dos operating system, reducing the available workspace. **Figure 2** shows the reduction in workspace that results when a TSR program is added.

In addition, many users are linked to a local area network. **Figure 3** shows that networking software and three TSRs reduced the available memory so that smaller programs, such as *Wordstar*, have limited workspace. Even medium-sized program like *Symphony* do not fit into this configuration.

Vendors have been looking for ways to solve the memory crunch problem for years. Lotus and Intel, for example, devised a method to let *1-2-3* address up to 8MB of memory. Later Microsoft, endorsed the Expanded Memory Specification (EMS or LIM for Lotus Intel Microsoft) standard. This bankswitching scheme allows up to four windows 16K each to be switched in and out of the useable memory space. Later versions revise this to 64 windows of 4K to 16K each, but this scheme is not commonly available.

With the EMS standard, programs are slowed by the continual checking to see if the correct bank is switched on. If a program's data fits properly and doesn't have to switch windows very often, this solution can help the memory problem.

If an application's architecture does not match the model implied by EMS, significant program modifications are needed. This expanded memory technique can be useful for certain types of programs, but, in general, is no substitute for direct access to a large amount of memory.

Another alternative to solving the Dos 640K barrier is to use a more powerful operating system, such as XENIX or OS/2. But because users are familiar with Dos, XENIX is difficult to learn, vendors are hard pressed to convince users to switch.

OS/2, on the other hand, is more compatible with Dos and can address up to 16MB of physical memory. It will be an alternative when a wide number of applications become available and the cost of high-performance OS/2 machines comes down. In addition, using the Dos compatiblity mode also eliminates the multi-tasking capabilities of OS/2.

Both the XENIX and OS/2 alternatives leave out one crucial element in the effort to gain more functionality for users – the large number of installed 286 and 386 PCs. Both XENIX and OS/2 requre extensive programming changes to standard Dos applications, which can be very time consuming for complex applications. In addition, upgrading the operating system requires changes in all of the users' other software to ensure compatibility.

The protected mode/real mode switching solution that uses Dos extenders, is the ideal compromise. Dos extenders help vendors solve the memory crunch problem within the Dos environment while meeting users' compatibility and functionality requirements. Also, Dos-extended applications are transparent to the user. The user need not worry about real mode versus protected mode; it is sufficient that the application has the necessary functions and speed. Even the documentation is the same between standard Dos and Dos extended applications.

For comparison, The figure **'Extended VS Expanded Memory'** shows the difference between extended memory and expanded memory (as in the EMS standard). While expanded memory can work with 8088/86, 286 and 386 PCs, a separate memory card is required. The extended memory utilised by Dos extenders uses the physical memory that is native to 286 and

EXTENDED VS EXPANDED MEMORY

EXTENDED	EXPANDED
• Accessed by Protected Mode	• Called EMS or LIM
• 286/386 only	• 88, 86, 286, 386
• Native Memory	• Bank Switched
• Above 1MB Line of 286	• Separated Address Space
•Directly Addressable by Programs	• Carefully managed by Programs
• OS2 or UNIX, Xenix use extended	• Not useable by OS/2 or Xenix

386 machines.

Extended memory is directly addressable by application programs, eliminating the time-consuming bank switching and swapping that occurs with the expanded memory solution.

Dos extenders automatically and transparently switch between real mode and protected mode. They act as an interface between a program running in protected mode and the Dos operating system. In a sense, Dos extenders 'fool' Dos into thinking that an application is running within the standard 640K bytes of RAM.

Figure 4 illustrates what parts of a program reside in real mode or protected mode. Dos, networking software, the TSRs and a small portion of the Dos extender reside in the 'lower 640K'.

This segment of the Dos extender is perceived by Dos as the actual application program. In other words, in the case of Rational Systems Dos/16M, Dos sees a 24K application, when in reality the application program resides in protected mode. The Dos extender handles all program interrupts and automatically switches between real mode and protected mode when necessary.

A Dos extender does more than simply transfer data between conventional and extended memory. Applications see a Dos (and BIOS) that know about 16MB. Applications that run in protected mode eliminate the need for overlays, data swapping and other memory conservation techniques that reduce performance. Using Dos extenders, developers can concentrate on adding functions and features rather than trying to squeeze a program into 640K of memory.

Dos extenders also provide direct control of switching between real and protected mode under program control and for issuing intermodeal procedure calls. This allows a Dos extended application to use real-mode function libraries or other code that cannot be ported to protected mode because the source is not available.

Figure 4 also presents a comparison with **Figures 1 through 3.** By moving the applications above the 640K barrier, there is plenty of space in memory to handle large applications and worksheets, without sacrificing TSR and networking capabilities. It is important to note that Dos extenders equally benefit existing programs, such as *Wordstar* or *Symphony,* and larger programs, such as mainframe applications ported to a PC.

For the vendor, Dos extenders require only minimal changes to a Dos application, while porting a program to OS/2 or XENIX requires many more modifications. The benefit is that Dos

Fig 1

In the early days of PC development, 640KB was a great deal of memory if the applications were either small or medium-sized. However, when developers started to want mainframe or mini-sized applications to run on their PCs, the 640KB limitation became apparent.

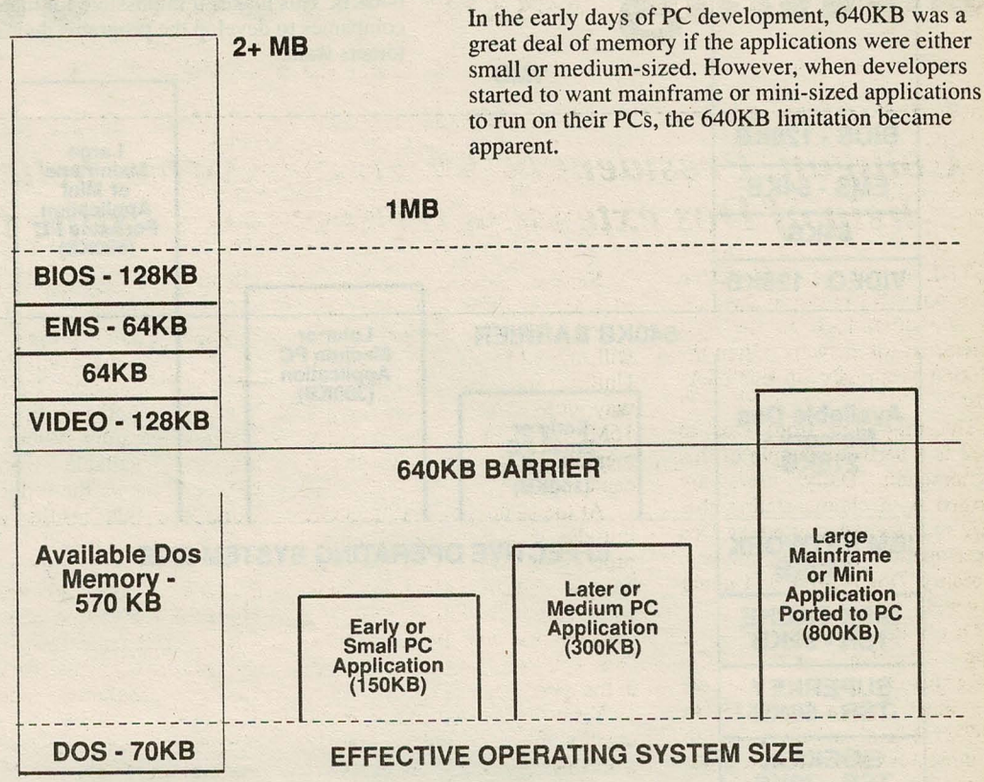


Fig 2

With the popularity of TSRs, the overall Dos operating system gets larger and takes up more of the available 640KB memory space. Even medium-sized applications begin to run out of room to operate.

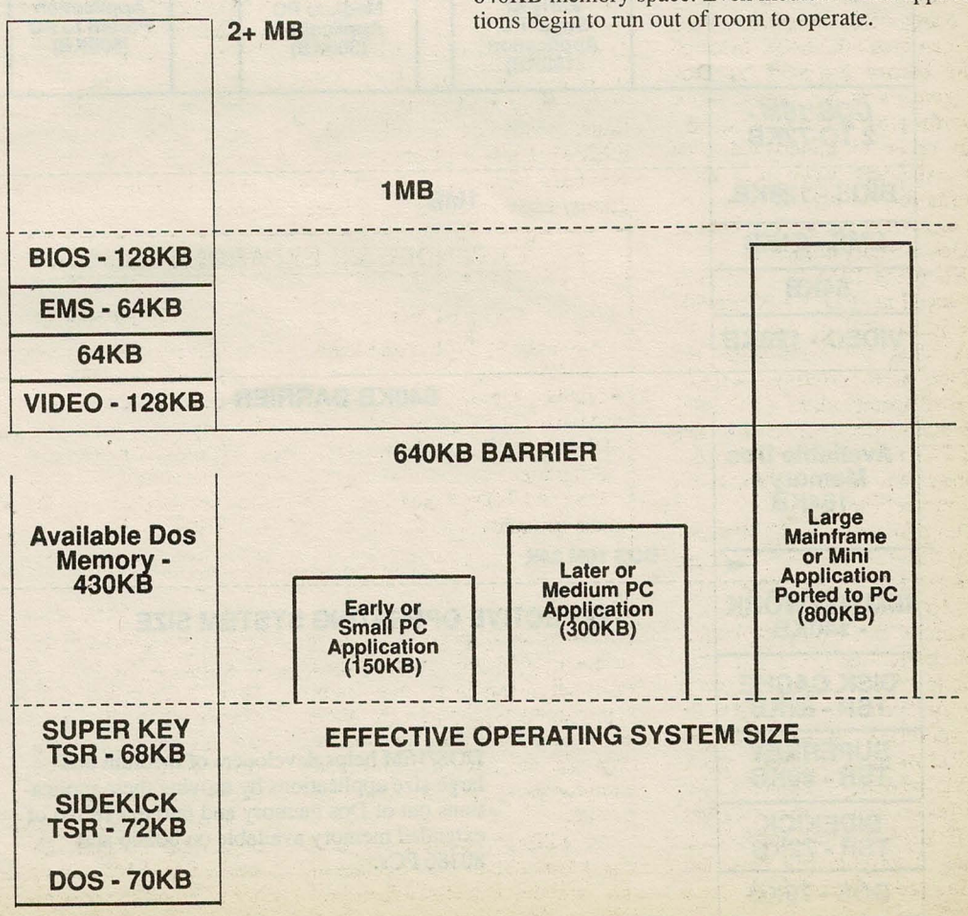
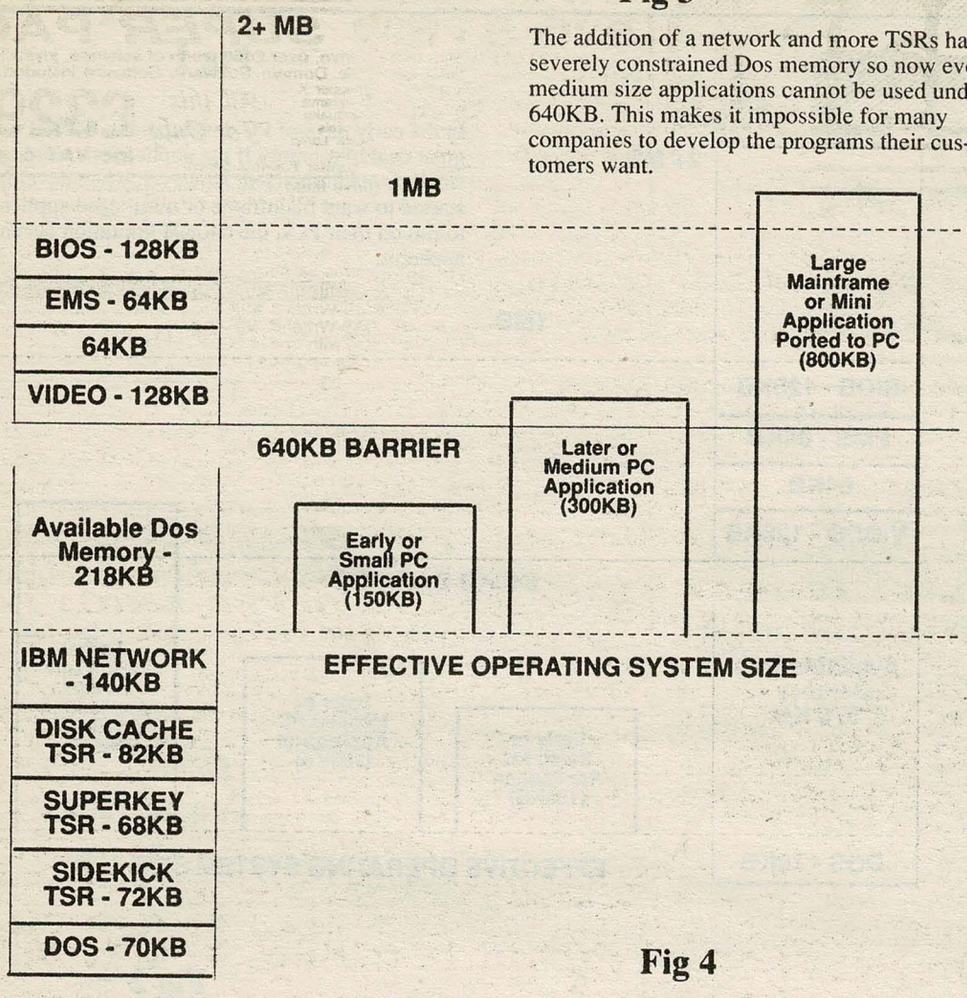
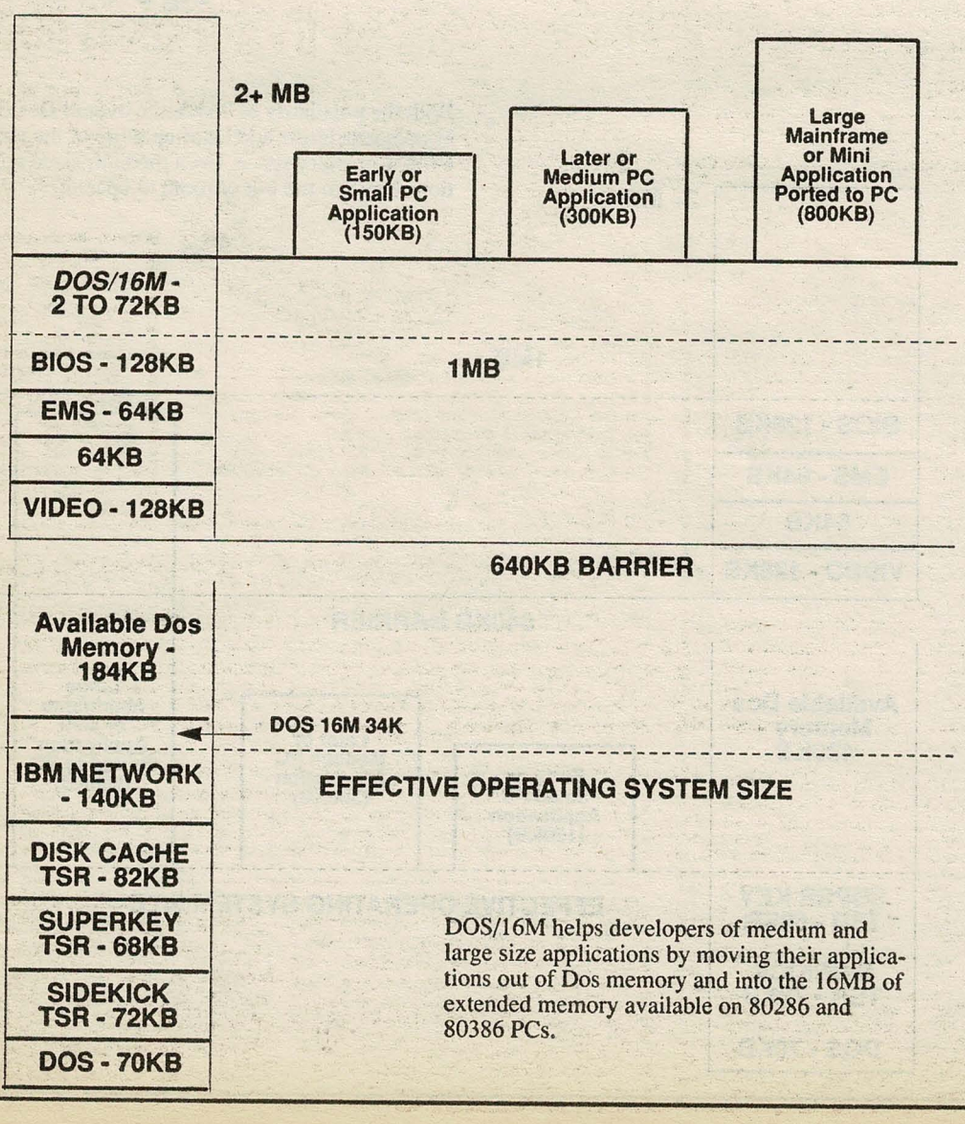


Fig 3



The addition of a network and more TSRs have severely constrained Dos memory so now even medium size applications cannot be used under 640KB. This makes it impossible for many companies to develop the programs their customers want.

Fig 4



DOS/16M helps developers of medium and large size applications by moving their applications out of Dos memory and into the 16MB of extended memory available on 80286 and 80386 PCs.

extenders enable vendors to quickly and easily provide extended programs while the user only notices greater functionality or higher speed.

By using native memory, Dos extenders provide several advantages. The first being that Dos extenders can either eliminate the need for OS/2 or act as a bridge to OS/2. Because users face a decision of whether to migrate to OS/2 or stay with Dos, this benefit is very important.

Arguments for OS/2 state that the operating system's multitasking capabilities and ability to support large programs make OS/2 more attractive than standard Dos. But with Dos extended programs, users gain the necessary physical memory space to handle most applications. Also with protected mode Dos, programs can be combined with multitasking environments, such as *Windows 286* from Microsoft and Quarterdeck's *Deskview/386*, to provide multifunction capabilities.

The decision to switch operating systems is a difficult one. Market projections by International Data Corporation support the fact that many users will decide not to change.

IDC states that very strong 286 sales will continue for the next few years, meaning that many users will stay with their existing Dos standard. Today's 286 computers, for example, are several thousand dollars cheaper than the new Micro Channel PCs that are designed for OS/2, and 286 prices will continue to decrease. Software that incorporates a Dos extender will provide powerful applications for users who decide to stay with 286 and 386 Dos-based PCs.

On the other hand, some users may want to change to OS/2 machines. Usually they already have standardised on Dos-based PCs. By using programs that take advantage of Dos extenders, users have access to larger programs with more functions while using a system that they are comfortable with, their AT-class computer. For the corporation, this is an inexpensive way to train its users on larger, more powerful applications while waiting for the cost of Micro Channel to fall.

This demonstrates the fact that most users have not utilised existing equipment to its fullest potential. While the next generation of computers will provide solutions that offer many advantages over current generations, how many users are ready to change?

For those that aren't ready, Dos-extended applictions provide more functions while enabling users to continue gaining value from their existing base of equipment.

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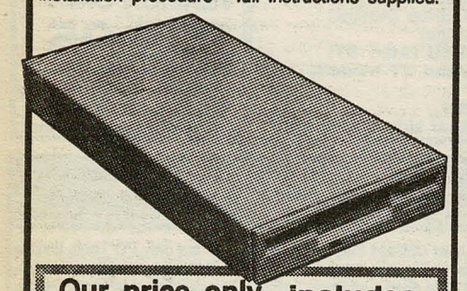

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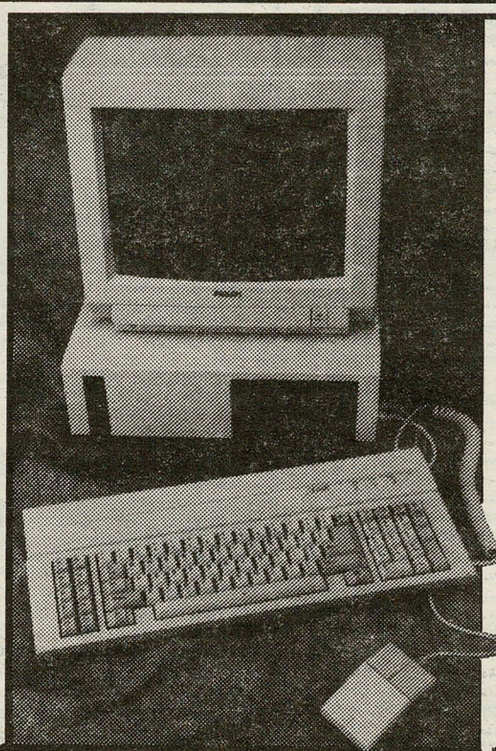

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MONO 1640	474.78 546.00	555.65 639.00	738.26 849.00	656.52 755.00	737.39 848.00	673.91 775.00	754.78 868.00
CGA (colour) 1640	581.74 669.00	651.30 749.00	825.22 949.00	763.48 878.00	833.04 958.00	780.87 898.00	850.43 978.00
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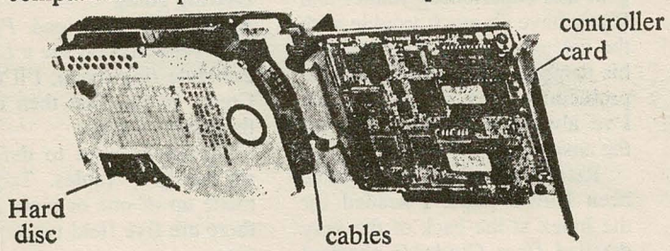

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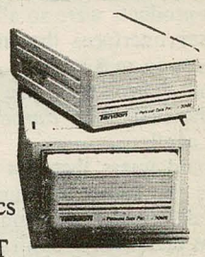

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Seagate138 *	**32**	**35**	**£259**
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Paradox lost

by David Robinson

Many of the virtues of Paradox version 3.0 were lost on Huw Collingbourne, says David Robinson. A reappraisal

HAVING READ, and not fully agreed with, Huw Collingbourne's opinions on *Paradox* in Rants in the February issue of *Shopper*, I felt that I had to put the record straight, or at least provide a second opinion

We have used *Paradox* regularly in our office ever since it was first introduced here over three years ago – so I feel well qualified to write about both its strengths and its weaknesses.

While re-reading Huw's two previous articles, the latest issue of *Shopper* (May 89) fell through the letter box and I noticed that in Rants and Raves he reluctantly admits to growing to love *Paradox*. (I also noted that in the author's potted biography his hobbies include Aikido, so in the interests of personal safety I'll keep the personal abuse down to minimal levels).

Paradox 1-2-3

At one time the *Paradox* marketeers were putting forward the line that *Paradox* was the ideal database for the *Lotus 1-2-3* user. Presumably they were trying to tap the large fund of goodwill built up by *Lotus*, suggesting that the two products were so alike in their user interfaces that if you knew how to make *Lotus 1-2-3* sing and dance, then you'd be doing the same with *Paradox* in no time at all.

I would guess that this campaign is the source of much of Huw's disgruntlement with the way that data Tables don't really behave like spreadsheets at all. The whole point is that by displaying basic data in rows and columns (one record to a row, one field in each column) *Paradox* isn't trying to look like *Lotus 1-2-3* it's simply using a standard way of displaying database data.

The use of the word 'Table' to describe the organisation of a data file should properly be ascribed to Edward Codd. It was he who first described the relational model for databases and drew up a set of a dozen or so rules to which a Fully Relational database was supposed to conform. This was back in the 60s. However, I read somewhere that since then he has added a whole host of new rules to which a database must conform before it can be properly described as fully relational.

However, one of the basic principles of Codd's rules is the organisation of data into two dimensional Tables. Any resemblance between a data table and a spreadsheet is purely coincidental.

Paradox is not alone in offering the basic data table as one of the ways of looking at your data – you can also see this kind of presentation in *RBase*, *Reflex* (also from Borland) and many other databases. The caption under the illustration in February's Rants and Raves, 'Paradox desperately trying to look like a spreadsheet', is pure Codds-wallop.

As you will see later there are some occasions where I fully agree with Huw about *Paradox*'s bad points, but after three years of regular use in our own office, and having sold a number of copies to clients who use it for a whole variety of tasks, I do feel that the tag 'uniquely hostile' is wholly unjustified.

Tracking Huw's tears

So how did a presumably intelligent and experienced Ranter and Raver have so much trouble with the calculated field he wanted in his database? The solution to the problem is easy and I feel that I've always instinctively known the answer.

Retracing what must have been Huw's steps, I headed for the Index at the back of the very detailed *User Guide*. (I checked both versions 2 and 3, Borland please note). Here could be the answer – the version 3 Index makes no reference to calculated fields – only a couple of references to the same pages (75-77) which describe calculations in queries.

In the version 2 *User Guide* the index refers to the correct solution, which is to put your calculated fields in a Form.

It's hard to tell for sure, but it seems that quite a lot of detail was left out of the version 3 chapter describing the FORMS function. Indeed, although the version 3 manuals have a larger page format, the user guide appears to have shrunk disproportionately from 555 pages down to 310, despite the fact that *Paradox 3* has more features than *Paradox 2*.

Overall I would expect that most of Huw's problems could be put down to difficulties with the documentation rather than with *Paradox* itself.

For readers who have not used any of the versions of *Paradox*, what follows is a definitive description of the program's features.

Getting going

When you first load *Paradox* (any version) you see a *Lotus 1-2-3*-style ring menu. I'll take the Create option first then describe the others in order.

Create is used to define and set up new Tables. Tables are made up of one or more fields – there are five field types you can use:

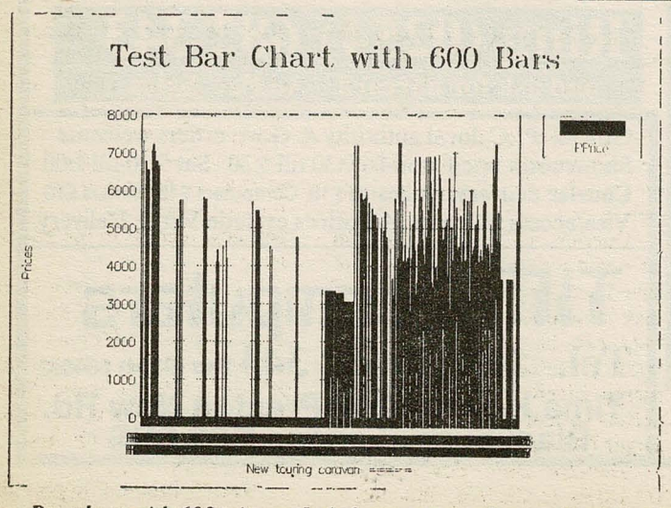
Alphanumeric
Numeric
Currency
Short number
Date

With the exception of the Alphanumeric type, which can be between one and 255 characters long, you have no control over the amount of storage taken up by each field (ie you can't define a field as being numeric with eight digits, three after the decimal place).

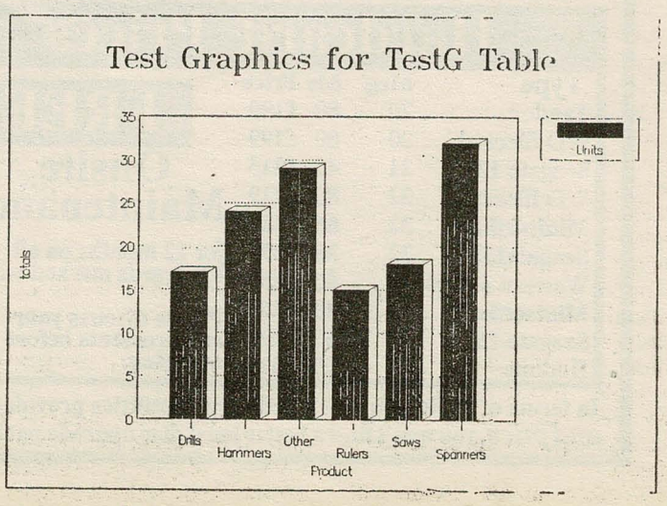
That's not to say that you can't control how fields look or how they are edited. Indeed, you have a lot of control through the use of Field Pictures. It is just that storage size for numeric and date types is fixed.

Field names can be up to 25 characters long and the number of characters you're not allowed

Top of the charts



Bar chart with 600+ items. Labels are a mess, but it still printed



Attractive 3D features are also available

to use is very small. Thankfully, you can include spaces in field names, so there's no excuse for not using meaningful field names.

When creating a Table you can designate one or more fields as forming the primary key for indexing. The primary key fields MUST be listed at the top of the table definition and are designated by placing a * character after the field type.

If you want to use more than one index then secondary indices cannot be designated using Create – you have to use a different technique (more of this later).

Paradox objects

Part of the flexibility of working with *Paradox* comes from the fact that it is object orientated. The various kinds of *Paradox* object are:

Tables
Indices
Forms
Reports
Scripts (programs written in the PAL language)

Each of these kinds of object works, as far as possible, independently from each other. You can, for instance, add new fields to a table without affecting any of the existing forms or reports. Contrast this with database applications written in procedural languages like Pascal or C where the addition of a single field to a file could result in the re-writing of all the file handling sections of every program which accesses that file.

View

This function is the primary means of accessing data when using *Paradox* interactively (as opposed to using the PAL language). You can View many different tables at once and you can adjust the amount of screen space taken by each table. There is no need for tables to be linked in any way before you can have them in view at the same time.

While viewing a table you can make changes to data using either Edit mode or Co-Edit mode. The difference between these two modes is that Edit has a full Undo facility, whereby you can abandon all changes made to the table since commencing edit whereas Co-Edit does not. The main reason for this is that Edit places a full file lock on the table being edited so that (if using a network) other users cannot make changes until you have finished editing. Co-Edit, however, only locks the current record, so that two users cannot make simultaneous changes to the same piece of data.

Another useful feature of View is the ability to switch between Table View (the so-called spreadsheet presentation) and Form view where you see just one record at a time on the screen. *Paradox* will create a default form for you or you can customise your own forms (up to 16 per table) using the Forms function.

Finding specific bits of information is easy using the Locate function – this works rather like the search or find features of most word processors. If you want to search for specific data in a more sophisticated way then the Ask function is the thing to use.

Ask

This feature controls one of the outstanding features associated with *Paradox* (all versions) – Query By Example, or QBE for short.

The idea is quite simple – you just fill in a blank template representation of your table(s) ticking off the fields which you want to see in the Answer to your query. In addition you can specify things like:

Ranges of values
Links to other data tables
Whether you want to see duplicate records or not in the answer
Calculations
Groups of records

The results of any Query are placed in a special temporary table called Answer. If you want to keep the Answer data for further use then you can rename the Answer table using the Rename option which is part of the Tools option on the main menu.

Queries, once designed, can be saved for future use. They are saved as scripts and stored on disk in pure ASCII format so that they can be edited using most word processors. You can even merge saved queries into other scripts so that they form part of a larger PAL application program.

The *User Guide* devotes a full 60 pages to the Ask function – the largest and most fully documented section of the manual.

Report

The *Paradox* Report function is powerful and full of features. You can have up to 15 different reports associated with each table.

Reports can contain groups of records with nested sub-totals, multiple page widths, calculations and statistics. Data which is too long to fit into the column width assigned to it can be automatically word wrapped onto subsequent lines.

You can choose between two basic report models – one which is essentially tabular or column-based, and a second totally free format report. If you use the tabular form you are not restricted to a simple one record per line, one field per column format. The tabular format is so flexible that I have used it to create an invoice printer for one client.

The free form kind of report is powerful enough to be used to print mail merge letters with variable data embodied in the text.

If you want to produce reports containing data from two or more table then you must first perform a Query then print the report from the resulting Answer table.

Modify

This option allows you to make changes to your data tables without loss of any existing information (except, of course, where you deliberately delete a field or reduce its size).

Under the Modify heading the options are:

Sort
Edit
Co-Edit
Data entry
Multi-Entry
Restructure
Validity checks

Sort allows you to re-arrange the records in an un-keyed table into a sequence based on the values in one or more fields. Edit and Co-Edit were discussed under the View heading but can also be accessed through the Modify option.

The Data Entry function allows you to enter a batch of new records which are added to the table only when the data entry session is complete. In concept this is the same as using Edit to add new records to the end of the table.

Multi-Entry is a way of entering data into a form which is then used to make additions to more than one data table. Note that this is not at all the same thing as being able to look at two separate tables displayed on the same screen form.

The Restructure option allows you to add new fields to a table,

Continued on page 56

Constructing a graph

```
Defining the type of subsequent graphs.                    Graph
[F1] for help with defining graph types.
 -- Customize Graph Type ----------------------------------------
 |  Select a basic graph type from the      | Basic Graph Types:  |
 |  options on the right.                   |  (S)tacked Bar      |
 |                                          |  (B)ar - Regular Bar Graph
 |  Graph Type: Stacked Bar                 | (3) 3-D Bar         |
 |                                          |  (R)otated Bar      |
 |  ---------------------------------       |  (L)ine             |
 |                                          |  (M)arkers          |
 |  Series Override Graph Type              |  (C)ombined Lines & Markers
 |                                          |  (X) X-Y Graph      |
 |  To create a mixed graph type, select    |  (P)ie Graph        |
 |  a series override graph type for        |  (A)rea Graph       |
 |  each series.                            |---------------------|
 |                                          | Series Override Types:
 |  1st Series: Not Applicable              |  (L)ine             |
 |  2nd Series: Not Applicable              |  (B)ar - Regular Bar Graph
 |  3rd Series: Not Applicable              |  (M)arkers          |
 |  4th Series: Not Applicable              |  (C)ombined Lines & Markers
 |  5th Series: Not Applicable              |  (N)one (for labels)|
 |  6th Series: Not Applicable              |                     |
```

First you consult the Graph type screen

```
Defining the layout of the graph for printing.             Graph
[F1] for help with defining the layout of the graph printing.
 -- Customize Graph Layout for Printing -------------------------
 |  Units:  Inches                  | Measurement Units:        |
 |                                  |  (I)nches                 |
 |  Left Margin:  0                 |  (C)entimeters            |
 |   Top Margin:  0                 |---------------------------|
 |                                  | Orientation Options:      |
 |  Graph Height:  0                |  (L)andscape (Horizontal) |
 |   Graph Width:  0                |  (P)ortrait  (Vertical)   |
 |                                  |---------------------------|
 |  The margins and graph           | Break Page Options:       |
 |  dimensions are measured         |  (Y)es - Move to the top of the next
 |  in inches or centimeters,       |          page after printing the graph.
 |  as defined above.               |  (N)o                     |
 |  ----------------------          |---------------------------|
 |                                  | Plotter Speed Options:    |
 |  Orientation: Landscape          |  0 through 9              |
 |                                  |  0 uses the fastest or current speed
 |   Break Page: No                 |                           |
 |                                  |                           |
 |  Plotter Speed:  0               |                           |
```

Then you consult the Graph layout screen

Continued from page 55

delete fields from a table or adjust fields sizes up or down. Wherever a Restructure operation would involve data loss, *Paradox* always double checks with you that you really meant to do what you asked. If a field changes size or is deleted then you will have to adjust any objects affected by the change – this most usually means re-setting the field sizes on reports and forms.

Image
Under this heading are:

Tablesize
Columnsize
Format
Zoom
Move
PickForm
KeepSet
Graph

Tablesize and Columnsize allow you to adjust the number of screen rows and the width of individual column fields when looking at a table in the normal table view. KeepSet allows you to save those setting so that you don't have to re-adjust them every time you want to work with that particular table.

Format allows you to determine the number format for individual numeric fields. You can change the number of decimal places on view, whether commas are used as separators or not, or ask for display in scientific notation. You can also use the Format option to choose from DD.MM.YY MM/DD/YY orDD-Mon-YY (eg 31-Jul-89).

Using PickForm you can choose which of the custom forms associated with your table you want to use if you toggle between table view and form view. Move allows you to rearrange the order in which columns are displayed in table view. This is useful if the default order (ie the order specified when the table was created) is somehow inconvenient.

All of these above options were available under version 2 and most have hot-keys you can use to invoke the function without going through the menu system.

The final option – Graph is new to *Paradox* version 3. If the current table being VIEWed contains numeric fields then you can display those values in graph form. The graphics routines look very like those which come as part of the Borland Graphic Interface in Turbo C and Turbo Pascal. They are fast, sharp, versatile and the range of fonts available for titles and lettering is very good.

Being a perverse individual, I thought I'd try to throw the graph drawing routine by asking it to graph the prices in a stock file with over 600 prices in it. The X axis labels were a proper mess, as you would expect, but the graph (bar chart) was perfectly scaled to cope with the large number of X axis observations. Trying the same trick with a pie chart produced a pretty, but unintelligible, pattern. Who wants a pie chart with 600 segments anyway? The important point is that the routines don't crash if you feed them with unreasonable values.

The graphics options are a useful addition to the range of *Paradox* features. My only moan so far is the way that user control always returns to the workspace after each operation. I would much prefer that user control stayed within the graphics menus.

Forms
You can design forms which greatly enhance the ease of dealing with data. If, as Huw did, you find the table view inadequate then you can overcome most problems of data entry and handling using a Form.

Forms can have multiple pages (great for dealing with large records) fields can be included or left off, as you wish, and can optionally be designated as display only. When combined with the available field validation checks which include automatic look up of values in other files (eg you can look up a sales ledger account number when entering sales invoices – no programming required) and Picture control over field formats you have very tight control over the data entered by application users.

In older versions of *Paradox* you had virtually no control over screen colours beyond Inverse and Blink. In version 3 you can now use the full range of colours allowed by your hardware in text mode.

Tools
Under the Tools option is a whole range of utilities to perform both major and minor tasks. The most impressive is Export/Import which handles data in foreign file formats with ease. You can deal with files from *Lotus 1-2-3* and *Symphony*, *dBase*, *PFS* and *IBM Filing Assistant*, *Reflex*, *Visicalc* (does anybody really use that any more?) and, of course, ASCII.

There are also tools for password protecting files. When protected in this way data is also encrypted so that clever types with disk sector editors can't get round the password protection.

Everything we have looked at so far has been accessible just using *Paradox* in interactive mode. To achieve most of this functionality using many other database products would require extensive programing in a script language.

Indeed, for me, the interactive way of using *Paradox* is easily the best. You can get a new user up and running doing useful work within minutes of introducing them to the program – I know because I have done this many times over. Users don't need to have any special ability and certainly don't need to be programmers.

Scripts and PAL
Paradox does have an extensive language built-in called PAL (Paradox Applications Language). Programs written in this language are called Scripts and, like *dBase*, PAL is an interpreted language.

The secret of successful PAL programming is a sound understanding of the way *Paradox* works when used interactively. Although you don't see the interactive interface responding to the commands (say as you would if using a keyboard macro program to automate some job) that nevertheless is what is happening. Some of my early PAL scripts didn't work in the way I expected because I forgot to visualise what effect the commands would have if used interactively.

At various times over the last two years Borland has made serious efforts to woo applications developers into using *Paradox* PAL. There's a lot in the PAL language that's very attractive if you're writing bespoke applications for others to use. In particular the separation of data entry/edit forms and reports as objects quite distinct from your program code has tremendous advantages.

However, as with most (should I say all?) database packages of this kind there is a drawback – speed. Frankly after spending a week writing a very complex invoicing/sales ledger (there were trade discounts with different volume breaks, different settlement discounts for different customer/product combinations, different product base prices for different customers etc etc). I gave up and re-wrote the job using *Databoss* to generate C source code.

Why? The answer was speed – or in this case, the lack of it. It took a week to write the application described; pretty good going for something that complex. I then spent two more weeks trying to get it working at an acceptable speed before giving up in disgust. The target hardware was a 12.5 MHz AT clone with 40Ms hard disk – not state of the art but not exactly a slouch machine either.

I think the answer lies in the fact that *Paradox* itself does use rather a lot of memory. This is OK if you're working interactively. But when you start loading large scripts and have to work with six or seven tables all at once things slow down dramatically. This is because *Paradox* tries to keep everything running by swapping 'unwanted' script procedures and data out to hard disk using a kind of virtual memory scheme. As the available memory decreases the disk swapping increases – at the expense of getting real work done.

The *Paradox* Support Group suggested adding expanded memory boards to the client's machines – but that's not really an acceptable answer.

So the overall verdict on PAL is that it's fine for automating small tasks and has some excel-

Continued on page 58

Paradox file structure

```
Restructuring Newstock table                                  Restructure

STRUCT┌──────────Field Name──────────┬Field Type┐
      1 │ New touring caravan =====  │ A4       │
      2 │ Make and model             │ A27      │
      3 │ Year                       │ N        │
      4 │ Factory order no           │ A12      │
      5 │ Order date                 │ A8       │
      6 │ Serial number              │ A10      │
      7 │ Date in stock              │ A8       │
      8 │ Supplier                   │ A13      │
      9 │ Invoice date               │ A8       │
     10 │ Consignment no.            │ A8       │
     11 │ Invoice number             │ A6       │
     12 │ Adoption due               │ A8       │
     13 │ Date adopted               │ A9       │
     14 │ Purchase price             │ $        │
     15 │ V.a.t.                     │ $        │
     16 │ ------------------------   │ A1       │
     17 │ Surname                    │ A1       │
     18 │ Address 1                  │ A1       │
     19 │ Date comm.paid             │ A1       │
     20 │ Address 2                  │ A1       │
     21 │ Salesperson                │ A1       │
     22 │ Address 3                  │ A1       │

        ------- FIELD TYPES -------
        A_: Alphanumeric (ex: A25)
         Any combination of
         characters and spaces
         up to specified width.
         Maximum width is 255

        N: Numbers with or without
         decimal digits.

        $: Currency amounts.

        D: Dates in the form
         mm/dd/yy, dd-mon-yy,
         or dd.mm.yy
        ------------------------
        Use '*' after field type to
        show a key field (ex: A4*).
```

No problems if you want to restructure an existing data table

Flat bed printing

by Jason Jones

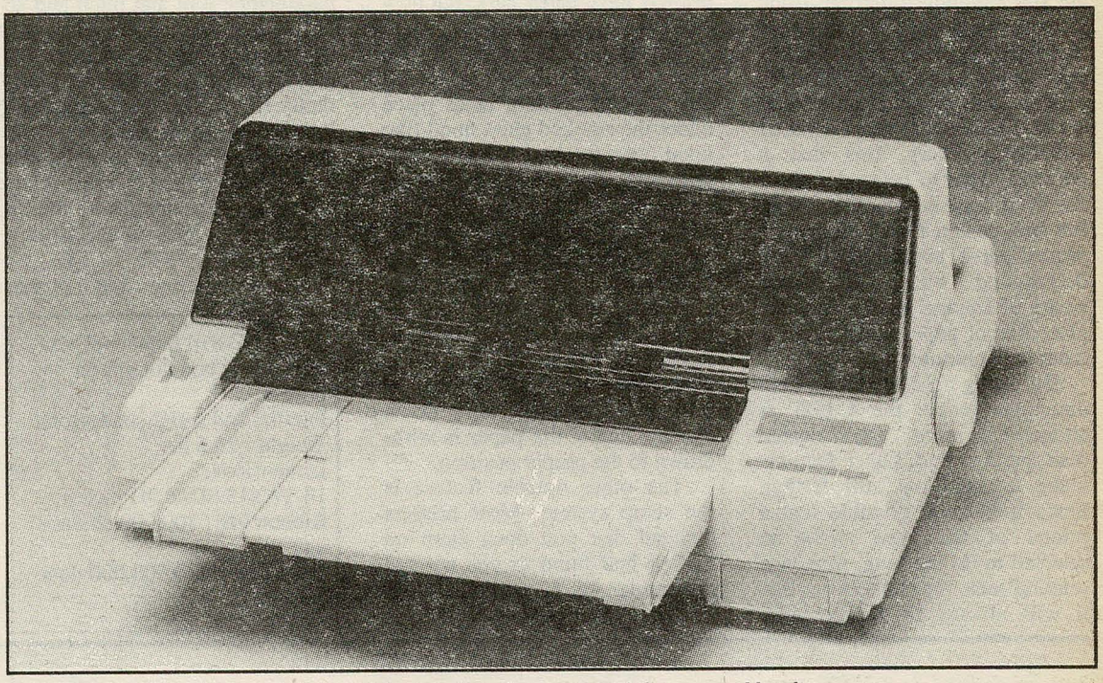
Jason pulls back the covers on C.Itoh's flat bed C-610, a printer that is designed to cope with the roughest of treatment

FOR SOME print tasks traditional printer designs can be a real pain in the posterior. I can't remember how many times I have poured over a dot matrix, armed with a pair of scissors or knife, in an attempt to extricate just one part of one sticky label which has managed to weld itself between the roller and the platen.

And it isn't just labels which cause the problems. Haven't you ever noticed how the perfect database, designed specially for the despatch department and which manages to cleverly fill out all of those wretched multi-part forms, fails, not because of your software, but because the pages slip just a tiny bit, but enough to bring the whole operation to a complete standstill as the print head rams into the subtle paper folds. It's five twenty five and the ANC man is here. Watch the storeman curse the day he ever laid eyes on a computer, let alone a printer.

Normally one avoids these little problems by buying printers which offer a bottom feed. Instead of the pages of continuous stationery being fed into the printer from behind, like a typewriter, the paper rises vertically into the printer from underneath, such that the path of the paper is one straight line until it reaches the print head, and then you don't give a damn what happens to it. The advantage of bottom feed designs is that since the paper is not bent, or in any way deformed, it is less likely to be snarled in the mechanism. Unless you lead a particularly unhappy life, sticky labels only tend to come away from the continues backing when the backing is bent or curled. It doesn't get bent or curled with bottom feed, instead people just leave large boxes of stationery on top of the label pile so that the next 3,000 addresses all appear on just the single row of labels. Economical on paper, but hell for the postman.

One more thing. Not many dot matrix printers will print on cardboard – bottom feed or otherwise. In fact the thickness of the stationery is a prime consideration, especially if you are printing continuous multi-part forms, continuous envelopes or other composites. Most printers will only accept stationery with a total thickness of .25mm – I know, I looked, that's just the sort of guy I am. In fact the Epson LQ500 and Panasonic KXP1081 each manage .25mm, the Star LC24 copes with a little more at .28mm while the Panasonic KX P1180 swallows up .32mm. The C.Itoh C-610, however, is designed to print on stationery up to .38mm thick (that translates to one original and four copies), and it doesn't even get it fed through the bottom.



The C.Itoh c-610. A rugged little number, designed to cope with heavy workloads

All about face

The C-610 is a pretty unusual printer. Instead of the print head being mounted vertically with the paper rising upwards, the head is mounted horizontally so that the pins strike down onto the paper, which is fed under the roller over a flat bed. This approach means that you get all of the advantages of a bottom feed system except that the paper-out and -in piles can be placed behind and in front of the paper, and you can still see what is being printed, albeit upside down. A further advantage of this design is that the paper can be more easily fed into the printer, or at least it could be if you aren't forced to position the thing against a wall, in which case it is a lot harder to feed than a standard printer.

Unlike most printers, where the friction feed and tractor feed systems seem to interplay as the paper gets thicker, and so cause multi part paper to become skewed, the C-160's design permits the minimum interference, thick paper being tractor fed tends not to be coaxed by the friction feed.

What can it do?

Despite the appearance of the printer, it looks a little old-fashioned; you get all of the facilities you would expect from a modern 24-pin printer. Built-in friction and tractor feed; a print head which produces a matrix of 12 by 18 for draft and 36 by 20 in NLQ mode. The print method is bidirectional logic seeking to keep print time to a minimum.

Now for the mundane stuff. The printer uses a 24-pin print head which is claimed to manage 200cps, but it doesn't do quite that on average. Since that timing must be based on a printing being done for the full width of the head travel, it seldom is. The NLQ speed is rated at 66cps. These speeds will vary according to the print pitch you are using.

The printer operates in two modes. In Epson mode the C-610 emulates the Epson LQ-2500 including the bit image functions. There are a few differences, however, between the Epson commands and the C.Itoh's, nothing major though and they are all very well documented. In Epson mode you get two print modes, draft and NLQ, with five pitch settings for each mode ranging from 10 cpi to 20 cpi.

In IBM mode the IBM Proprinter XL is emulated. Again all of the functions and commands are well-documented including the slight variations from the standard command set. This emulation offers three pitch setting for each mode, ranging from 10cpi to 17.1 cpi.

A wide range of extra fonts is currently available, any of which can be installed by inserting the appropriate cartridge into the printer. Fonts include Pica 10, Courier, Letter Gothic, Elite, sans serif and many more. Although the printer seems ideally constructed for continuous stationery, one can purchase a sheet feeder to use instead.

In use

This is a large printer and ideally it needs to be placed on a printer stand, away from any obstructions. Shoving it up the corner will just make it inconvenient to use, although it does depend on how you intend to use the printer.

Paper can be fed in one of two ways. Tractor paper is fed in through the back and it is printed as it passes from the back to the front with the characters appearing upside down to the observer positioned in front of the printer. Fine if you have long runs of invoices or labels to print. In fact perfect for just such a task. But what if you want to use the printer's NLQ facilities and print onto single sheets.

Rather than having you poking round the back of the

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printer trying to place your paper, you simply select friction feed with the lever on the side, and place the paper under the roller by pushing into the front of the printer. As the printing is done, so the paper emerges from the back of the printer, with the characters appearing the right way up to the observer, so long as they are still standing round the front. An excellent idea. I remember that the only thing I liked about one of the other early Amstrad printers, you might even remember it since it came in a rather dull, grey livery, was that it allowed paper to be loaded from the front, and being of a similar flat bed design this arrangement proved most successful for the desk-bound who had grown weary of leaping up and down to place bits of paper down into the innards of a printer.

But being able to print in both directions marks the C.Itoh as altogether more sophisticated than the Amstrad. Other features make it stand out still further. Since it is quite possible that a printer of this type might be selected to do the long, mundane printing jobs, the chances are that it will always be loaded with some continuous stationery of some sort. The casual user, wanting to print just a couple of single sheets, can park the continuous paper at the back of the machine, so leaving the print area free for the cut sheet. When the task is finished you simply select tractor and hit TOF and the continuous paper is repositioned. Sure other printers have paper park, but now you have had it explained.

Another nice touch is the paper tear off function. Since most of the printing takes place under the smoked glass hood (the hood open detector is a real challenge to defeat), it is always tricky to see how else to get the paper out and torn off without doing complete page throw. The C.Itoh waits for a definable number of seconds after data has stopped being received, and then feeds the paper far enough to allow it be torn off cleanly. As soon as data starts coming down the line again, the paper is withdrawn to the proper position.

The other notable feature is the setup system. Most printers demand that you open them up and go half blind as you try and determine if a particular dip switch is set to on or off, or indeed even if it is the dip switch you are looking for. Instead of all of this hassle the vast majority of the printers defaults are set from the operating panel. By working your way through a series of menus and toggling options you can set up all manner of parameters from CR LF action, emulation, Buffer size, Serial port parameters, font and pitch and so on. And better yet, you can ask the beast to give you a list of default settings as they are currently fixed. This just has to be a lot better than decoding dip switches. Perhaps this is the reason why so many laser printers adopt this approach, but in any event its nice to see it on a dot matrix.

Looking after the printer should be very easy. The design means that most of the workings are easily accessed for cleaning, although I did have a little more fun than I expected fitting the ribbon. It was darned easy to take out, but something of a trial to replace. By the way, colour ribbons can be purchased to make the thing perform seven-colour printing.

C..ItoH C-610 £680 excl VAT.
24 pin Flat bed dot matrix printer.
Parallel and serial connectors.
Weight : 26.5 lbs
Dimensions:
18.3Wx13.8Dx8.3H inches.
Ribbon life : 300,000 characters.
Head Life : 200,000,000 dots per pin.

All in all

Not a cheap printer by any means, but one which certainly seems built and designed to withstand a rough and hard working life. I would have no hesitation in recommending this printer to the despatch department. Its excellent design and durability make it ideal for those long and onerous printing tasks, which I am sure that it would carry out reliably. But for the person who wants NLQ print and a desk-top printer. The only advantage I can see for you is not having to stand up to put the paper in, but there are a great many more printers out there which could do a better job, and keep you fit as well.

Contact

C.Itoh (01) 946 4960

Continued from page 56

lent features – but for larger applications it's not going to shine unless all your users have a 386 computer or Borland come up with a compiler for PAL.

I will conclude the section on scripts by saying that I agree wholeheartedly with Huw Collingbourne about the built-in script editor – it's dreadful !

Paradox on networks

On installation you can choose whether to set up for single user hardware or for use on a network. If you choose network operation then files can be shared and edited by multiple users. An additional useful feature is the network automatic refresh of data changes. For example, if three users are all Viewing the same data table and user number one edits the information in a field then as soon as he has completed the edit of a record the changes will be shown on the screen of the other two users.

When you install for network operation you have to include serial number information as part of the install procedure. In this way *Paradox* keeps track of how many copies you have actually purchased. As each user runs a copy of *Paradox* the number of active users at that one point in time is updated. If, say, you have installed three copies of *Paradox* for network use, and all three copies are in use, the fourth user will not be able to use the database until one of the other three exits from *Paradox* and the user count is reduced to two.

Network installation is not for the beginner – especially if all the computers on the network don't share the same hardware configuration. The *Guide for Network Administrators* has been improved for *Paradox* version 3 and has been expanded from 75 pages up to 93.

The guide also contains a section entitled 'Network Performance Issues'. Again my experience is that network operation can be significantly slower than when used on stand alone hardware. *Paradox* will work on the slower DNA/Amstrad/Sage type networks but don't expect it to work quickly.

Documentation

If you suffer from back trouble then get a friend to move the manual pack for you! There's masses of it.

The documentation comprises six separate manuals now in the larger than A4, US Letter, format. Each manual has a soft cover and is (so-called) perfect bound. I don't know why this kind of binding is called 'perfect' – I have always found that, with continuous use, the bindings always crack and the pages then fall out.

As reference documentation it is fairly good, but there are some serious omissions. Huw's problem trying to achieve calculated fields is a clear case in point. The manual is also incorrect on the use of QuerySpeedup (Tools menu) to set up secondary indices in single table queries. It doesn't work with single table queries but the manual doesn't tell you this.

Huw's experience of clearly getting off on the wrong foot indicates the need for some good tutorial material. The 125-page Introduction makes some attempt at worked examples but is no substitute for some real, out and out training material.

I would also suggest to Borland that it considers including an index for the documentation pack as a whole. Each manual has its own index but that's not a lot of help if the subject you want is also covered in a different manual.

Conclusion

Overall I have to say that *Paradox* is a good, reliable, high function, high performance database. We have used it in our own company (version 1, version 2 and now version 3) since its introduction some three years ago. We have also installed it at various clients where it performs useful work.

I like it because it's easy to use interactively and has more than enough function and power to do some very complex tasks. At the same time you can teach a beginner to start to use it in less than half an hour.

The areas where it has shortcomings – heavy memory use, slow program execution and glitches in the documentation – also tend to afflict the other main competitors in this marketplace.

Like all complex software it can take some time to get fully 'up to speed' but *Paradox* repays the effort – even Huw now says he's learning to love it. (Rants & Raves May 1989).

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EPSON GQ-3500	6PPM	*	£1074
HEWLETT PACKARD LASERJET II	8PPM	*	£1279
HEWLETT PACKARD LASERJET II D	8PPM	*	£1979
KYOCERA F-1000	10PPM		£1489
KYOCERA F-1200	10PPM		£2389
KYOCERA F-2200	10PPM		£3279
KYOCERA F-3000	18PPM		£3939
KYOCERA P-2000 POSTSCRIPT	10PPM		£4359
MANNESMAN TALLY MT905	6PPM	*	£989
PANASONIC KXP4450	11PPM	*	£1349
QMS PS810+ POSTSCRIPT	8PPM		£2678
QMS COLOUR SCRIPT 100	1PPM		£17,500
QUME CRYSTAL PRINT WP	6PPM		£784
QUME CRYSTAL PRINT II	6PPM		£1045
QUME CRYSTAL PRINT POSTSCRIPT	6PPM		£2119
QUME SCRIPT TEN POSTSCRIPT	10PPM	*	£2969
STAR LP8	8PPM	*	£1249

ALL LASERS MARKED WITH AN * INCLUDES 1 YEAR ON-SITE MAINTENANCE

LASER PRINTER PERIPHERALS

CANON		2MB MEMORY	£359
1MB MEMORY	£279	**HEWLETT PACKARD**	
1.5MB MEMORY	£558	SOFT FONTS	FROM £159
FONTS	FROM £167	FONTS	FROM £85
JETSCRIPT POSTSCRIPT		1MB MEMORY	£279
UPGRADE	£1479	2MB MEMORY	£558
EPSON OPC DRUM	£149	3MB MEMORY	£889
CLEANING KIT	£79	JETSCRIPT POSTSCRIPT	
FONTS	FROM £119	UPGRADE	£1479

Please call for details of any other Laser periphals

SCANNERS

AST		**HOWTEK**	
Turbo Scan inc. interface & software	£879	Inc Interface and software	
CANON		A4 colour	£3948
1 x 12 Scanner	£599	A3 colour	£5359
Interface	£109	**PANASONIC**	
OCR Software	£319	FXRS505 inc. interface & software	£869
Flat bed Scanner	£699	**TAXAN**	
HEWLETT PACKARD		Flat bed Scanner inc. interface & OCR software	£1396
HP Scan jet plus inc. Interface & OCR software + 1yr on-site maint.	£1479		

MONITORS

AMSTRAD 12" paper white VGA	£119	SAMSUNG EGA 14"	£279
AMSTRAD 14" colour VGA	£259	SAMSUNG VGA 14"	£289
AMSTRAD 12" High Res. Col. VGA	£329	SONY CPD 1402 M/SYNC	£519
AMSTRAD 14" High Res. Col. VGA	£409	TAXAN KX123 Mono 12"	£89
CITIZEN CCM 104 M/SYNC	£419	TAXAN 620 12"CGA	£257
NEC M/SYNC GS	£132	TAXAN 760 14"EGA	£385
NEC M/SYNC 14" 2A	£479	TAXAN 770+ 14"M/SYNC	£419
NEC M/SYNC 15" 3D	£639	TAXAN 870+ 16"M/SYNC	£599
NEC M/SYNC 20" XL	£1337	TAXAN 780 14"VGA	£359
PHILIPS Ahkter 7513 Mono 12"	£70	TAXAN 980 20"	£1699
PHILIPS 8833 CGA 14"	£196	TAXAN 990 20"	£1779
PHILIPS 9043 EGA 14"	£249	VIKING II PC	£1479
PHILIPS 9053 EGA 14"	£299	**SPECIAL OFFERS**	
PHILIPS 9073 EGA 14"	£387	14" FST AMBER	£99
PHILIPS 9082 VGA 14"	£329	14" FST PAPER WHITE	£115
PHILIPS 8873 M/SYNC 14"	£423	14" MULTISYNC	£369

PLOTTERS

HEWLETT PACKARD			
7440A	£687	7575A	£3489
7475A	£977	7576A	£4289
7550A	£2589	7595A	£5769
7570A	£2689	7596A	£7329
ROLAND			
DXY880	£499	DPX 2200	£2229
DXY 1100	£564	DPX 3300	£2899
DXY 1200	£788	GRX 300	£3079
DXY 1300	£1019	GRX 400	£4199

Please call for all Plotter accessories

HARD DISKS

21Mb Hard Card	£184
32Mb Hard Card	£189
32Mb Hard Card 40MS	£209

All Seagate Drives below inc. Controller and Cables

20Mb MFM 65ms ST225	£169
20Mb MFM 40ms ST125	£189
30MB RLL 65ms ST238R	£176
30Mb RLL 45ms ST138R	£214
30Mb MFM 40ms ST138	£248
40Mb RLL 85ms ST250R	£235
40Mb MFM 40ms ST251	£265
40Mb MFM 28ms ST251-1	£288
49Mb RLL 40ms ST157R	£339
65Mb RLL 40ms ST277R	£329

COMMUNICATIONS

AMSTRAD		**MIRACOM**	
MC2400 INTERNAL V21/V22/V22BIS/V23 + SOFT	£148	WS 4000 V21/V23 EXTERNAL	£92
SM2400 external V21/V22/V22BIS/V23	£195	WS 4000 V21/V23 INTERNAL	£109
DATAFLEX		WS 3000 V21/V22/V23	£195
STRADCOM INTERNAL V21/V22 + SOFT	£138	WS 3000 V21/V22/V22BIS/V23	£289
STRADCOM POCKET MODEM	£159	**PACE** LINET V21/V23 EXTERNAL	£98
QUADCOM	£236	LINET INTERNAL V21/V23 + SOFT	£95
BISCOM	£238	LINNET 1200	£187
DOWTY		SERIES 4 2123S V21/V23	£209
QUATTRO V21/V22/V22BIS/V23	£479	SERIES 4 1200S V21/V22/V23	£309
QUATTRO PLUS	£549	SERIES 4 2400S V21/V22/V22BIS/V23	£378
		FAX CARDS C-FAX SR	£189
		C-FAX SRI	£239

LASER PRINTER CONSUMABLES

TONER CARTRIDGES	
EPSON GQ3500	£16.50
OKI LASERLINE 6	£16.50
HP LASERJETS	£65.00
HP LASERJET MK II	£65.00
QUME 2 PACK	£89.00
CANON A1/A2	£65.00
CANON A8 MK II	£65.00
QMS K8	£65.00
CITIZEN OVERTURE	£22.50
KYOCERA 2 PACK	£69.00
PANASONIC KXP	£32.00

COMPUTERS

SPECIAL OFFERS
Amstrad PC1640 S/D ECD with Seagate 30Mb Hard Disk **£869*** *Includes 1 year on-site maintenance
Amstrad PC1640 S/D ECD with Seagate 40Mb Hard Disk **£919***
Amstrad PCW 8512 **£375***
Olivetti M240 20Mb Mono **£959**

FREE 1 YEAR on-site maintenance on all Amstrad Computers (not portable)

AMSTRAD				
PCW 8256	£325			
PCW 8512	£375			
PCW 9512	£395			
	Mono	Colour		
PC 1512 SD	£375	£454		
PC 1512 DD	£454	£534		
	Mono	Colour	EGA	
PC 1640 SD	£469	£559	£639	
PC 1640 DD	£529	£609	£689	
PC 1640 HD	£689	£789	£868	
			12" Hi-Res	14" Hi-Res
	Mono	Colour	Colour	Colour
PC 2086 SD	£549	£668	£754	£834
PC 2086 DD	£659	£774	£848	£934
PC 2086 HD	£848	£974	£1069	£1159
PC 2286 DD	£879	£1009	£1099	£1179
PC 2286 HD	£1189	£1319	£1399	£1485
PC 2386 HD	£2319	£2459	£2539	£2649
TANDON			VGA	VGA
	Mono	EGA	White	Colour
PCA 12sl	£767	£1045	£918	£1115
PCA 12sl-20	£852	£1130	£1003	£1199
PCA 12sl-40	£938	£1215	£1089	£1286
PCA 20+	£999	£1281	£1164	£1361
PCA 40+	£1119	£1390	£1270	£1467
PCA 70+	£1279	£1555	£1430	£1627
PAC 286 1.2+	£938	£1214	£1089	£1286
DATAPAC 30Mb	£165	—	—	—
PAC 386/SX	£688	£1966	£1840	£2037
386 16-40Mb	£1688	£1949	£1840	£2036
386 20-40Mb	£2099	£2389	£2262	£2449
386 20-70Mb	£2250	£2523	£2399	£2599
386 25-110Mb	—	—	£3378	£3726

APRICOT		VGA WHITE		VGA COLOUR
Qi 310		£1728		£1982
Qi 330		£2155		£2408
Qi 330t		£2442		£2695
Qi 350i		£2368		£2622
Qi 350ti		£2655		£2908
Qi 650		£2727		£3048
Qi 650t		£3082		£3335
Qi 660		£3222		£3475
Qi 660t		£3508		£3762
Qi 660i		£3907		£4161
Qi 660ti		£4219		£4473
Qi Environment		£177		
EPSON				
	No Monitor	Mono	EGA	Colour VGA
PCe		£795	£1095	£1195
PCA x 2	£1049	£1095	£1339	£1449
PCA x 40	£1344	£1475	£1759	£1849
PCA x 80	£1698	£1929	£2179	£2259

PLEASE CALL FOR OPTIONAL ON-SITE MAINTENANCE ON ALL HARDWARE

PORTABLE COMPUTERS

AMSTRAD	1 YR on-site maintenance £49	
PPC 512 S		£355
PPC 512 D		£433
PPC 640 S		£438
PPC 640 D		£539
2 Slot Expansion Box for PPC's		£189
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30Mb Hard Disk for PPC's		£457
Linkmaster		£18
CAMBRIDGE		
Z 88		£195
Z 88 Gift Pack		£235
Call for accessories		
EPSON		
PC Port Dual Drive		£849
PC Port 20Mb HD		£1379
PC Port AX		£1988
SHARP		
4602		£929
4641		£1599
5541		£2538
TOSHIBA		
T 1000		£565
T 1200 FB		£1045
T 1200 HB		£1675
T 3100 E		£1885
T 1600		£2285
T 3200		£2655
T 5100		£3075
T 5200/100		£4499
ZENITH		
Supersport FD		£919
Supersport Z183 Mb		£1399
Supersport 20 Mb		£1689
Supersport 286 20 Mb		£2089
Supersport 286 40 Mb		£2469
Supersport 386 40 Mb		£3189

Please call for optional on-site maintenance.

PERIPHERALS

DISPLAY ADAPTORS	
HERCULES/CGA CARD/ PARALLEL PORT	£49
EGA/PARALLEL PORT	£99
ORCHID VGA	£169
ORCHID DESIGNER 800	£219
ORCHID PRO DESIGNER	£299
ORCHID PRO DESIGNER+	£399
RAM EXPANSION	
AST RAMPAGE (256K) POP UP TO 2MB XT	£239
AST RAMPAGE 286 (512K) POP UP TO 2MB AT	£338
PROCESSORS	
8087 5MHZ	£68
8087 8MHZ	£93
8087 10MHZ	£138
80287 6MHZ	£114
80287 8MHZ	£157
80287 10MHZ	£164
80C287	£279
80387 16MHZ	£279
80387 20MHZ	£339
80387 25MHZ	£439
PRINTER SWITCHBOX	
1 IN 2 OUT PARALLEL	£19
1 IN 2 OUT SERIAL	£19
2 IN 2 OUT x OVER PARALLEL	£29

EXPORT SPECIALISTS
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ALL SOFTWARE UK SOURCED
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SAGE ACCOUNTANT +	£156
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SAGE PAYROLL II	£90
SAGE JOB COSTING	£135
DATABASES	
DATA PERFECT	£299
DBASE IV	£334
DBASE IV DEVEL. ADD.	£569
FOXBASE + V.2	£248
LOTUS AGENDA	£199
PARADOX II	£253
PARADOX III	£339
SAGE RETREIVE III	£89
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AUTOSKETCH	£43
BYLINE	£129
FONTASY V2	£39
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LANGUAGES	
BORLAND TURBO C V1.5	£49
BORLAND TURBO C V2	£67
BORLAND TURBO PAS. V5	£67
BORLAND TURBO BASIC	£41
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FALCON	£35
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WITH PAINTBRUSH	£84
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WITH EASY CAD	£109
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AMSNET	£354
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D BASE IV	£729
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EXCEL	£239
LOTUS 123	£249
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WINDOWS 286	£55
WINDOWS 386	£99
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SIDEKICK PLUS	£78
WORD PROCESSORS	
LOTUS MANUSCRIPT	£249
MULTIMATE ADVANTAGE II	£250
MS WORD IV	£238
SAGE PC WRITE	£59
SPRINT	£119
TOPCOPY +	£65
WORD PERFECT LIBRARY	£75
WORDPERFECT V.5	£199
WORDSTAR 2000 + R3	£209
WORDSTAR PRO V5	£179

PRINTER RIBBONS

	2+	6+	12+
ACORN			
AP80	£2.40	£2.20	£1.90
AP100	£2.40	£2.20	£1.90
AMSTRAD			
8256/8512/LQ3500 MS	£4.00	£3.80	£3.60
8256/8512/LQ3500 FA	£3.30	£3.25	£3.10
8256/8512/LQ3500 Blue	£4.25	£3.95	£3.75
8256/8512/LQ3500 Red	£4.25	£3.95	£3.75
DMP 2000/3000/ 3160/3250	£2.40	£2.20	£2.00
DMP 4000	£3.85	£3.70	£3.40
LQ5000 DI	£8.00	£7.80	£7.50
PCW 9512 MS	£3.20	£3.00	£2.60
PCW 9512 FA	£3.70	£3.30	£2.90
ANADEX			
9500	£5.00	£4.45	£4.35
BROTHER			
HR5	£3.00	£2.80	£2.60
HR15/20/25/35/40 MS	£2.80	£2.65	£2.30
HR15/20/25/35/40 FA	£3.10	£2.70	£2.40
HR15/20/25/35/40 CO	£1.70	£1.60	£1.50
M1009/M1109/M1209	£3.10	£2.70	£2.50
M1409	£4.25	£4.05	£3.80
M1509/1709	£4.70	£4.25	£4.00
EP44	£2.90	£2.50	£2.30
C. ITOH			
8510	£3.55	£3.35	£3.10
CANON			
PJ1080 Black	£9.95	£9.75	£9.55
PJ1080 Colour	£13.95	£13.75	£13.55
PW1080/1156	£2.50	£2.40	£2.20
PW1080/1156 Blue	£3.40	£3.30	£3.20
PW1080/1156 Red	£3.40	£3.30	£3.20
CENTRONICS			
GLP 1/2	£3.10	£2.70	£2.50
CITIZEN			
120D/LSP10	£3.25	£3.10	£2.90
HQP 40	£8.50	£8.00	£7.40
HQP 40 colour	£21.00	£19.00	£18.00
LSP100	£3.25	£3.10	£2.90
MSP10E/40/50	£2.50	£2.10	£1.90
MSP10E/40/50 Blue	£3.70	£3.00	£2.80
MSP10E/40/50 Red	£3.70	£3.00	£2.80
MSP15E/25/45/55	£3.30	£3.10	£2.80
PREMIERE 35 MS	£2.40	£2.25	£2.05
PREMIERE 35 FA	£2.80	£2.75	£2.60
COMMODORE			
MPS 801	£2.30	£2.15	£2.05
MPS 802 MS	£3.50	£2.70	£2.50
MPS 802 FA	£4.50	£4.30	£4.00
MPS 803	£3.10	£2.70	£2.50
MPS 1000	£2.35	£2.10	£1.90
DPS 1101 MS	£2.40	£2.30	£2.10
DPS 1101 CO	£1.60	£1.30	£1.20
DPS 1101 SS	£2.20	£1.70	£1.55
1516/1521/1526/4023MS	£3.50	£2.70	£2.50
1516/1521/1526/4023FA	£4.50	£4.30	£4.00
DAISYSTEP			
2000 MS	£2.60	£2.40	£2.20
2000 FA	£2.90	£2.80	£2.60
DIABLO			
HYTYPE II FA	£2.75	£2.65	£2.45
HYTYPE II MS	£2.35	£2.25	£2.05
EPSON			
LX800/FX800 FA	£2.50	£2.10	£1.90
LX800/FX800 Blue	£3.70	£3.00	£2.80
LX800/FX800 Red	£3.70	£3.00	£2.80
MX/FX/RX 80 FA	£2.50	£2.10	£1.90
MX/FX/RX 80 Blue	£3.70	£3.00	£2.80
MX/FX/RX 80 Red	£3.70	£3.00	£2.80
FX105/FX1000	£3.30	£3.10	£2.80
MX/FX/RX100	£3.30	£3.10	£2.80
LQ 1500	£2.85	£2.70	£2.50
LQ500/LQ800/LQ850	£3.25	£3.05	£2.80
LQ1000/LQ1050	£3.80	£3.60	£3.35
LQ2500/LQ2500+	£5.95	£5.75	£5.55
LQ2550	£13.00	£12.00	£11.00
LX80/86/GX80	£2.35	£2.10	£1.90
EX800/EX1000	£4.70	£4.40	£4.00
SQ2500	£23.50 each		
HEWLETT PACKARD			
Deskjet	£13.60	£13.40	£13.20
IBM			
PROPRINT XL	£8.45	£8.15	£7.95
PROPRINT 4201	£4.10	£3.85	£3.55
JUKI			
6100 SS	£1.75	£1.60	£1.50
6100 MS	£2.40	£2.30	£2.20
6100 CO	£1.60	£1.30	£1.20
6200/6300/6500 FA	£2.75	£2.65	£2.45
6200/6300/6500 MS	£2.35	£2.25	£2.05
2200/6000 CO	£2.90	£2.50	£2.30
5510 FA	£2.50	£2.10	£1.90
5510 B/R	£3.70	£3.00	£2.80
KAGA			
KP 810/910	£2.50	£2.40	£2.20
KP 810/910 Blue	£3.40	£3.30	£3.20
KP 810/910 Red	£3.40	£3.30	£3.20
MICRO P.			
MP135/480 FA	£4.50	£4.30	£4.00
MP135/480 MS	£3.50	£2.70	£2.50
MP165/200	£2.50	£2.10	£1.90
MP165/200 Blue	£3.70	£3.00	£2.80
MP165/200 Red	£3.70	£3.00	£2.80
MP40/26 FA	£2.75	£2.65	£2.45
MP40/26 MS	£2.35	£2.25	£2.05
M/TALLY			
MT80 MS	£3.50	£2.70	£2.50
MT80 FA	£4.50	£4.30	£4.00
MT85 FA	£4.20	£4.00	£3.80
NEC P1/2/6	£3.90	£3.60	£3.20
P3/7	£5.10	£4.90	£4.60
P5/P5XL/P9XL	£4.70	£4.40	£4.10
P6+/P7+ FA	£8.00	£7.80	£7.50
P6+/P7+ MS	£9.95	£9.60	£9.40
5500/7700 FA	£3.65	£3.50	£3.30
5500/7700 MS	£2.65	£2.50	£2.30
3500 FA	£3.60	£3.40	£3.20
3500 MS	£2.70	£2.55	£2.35
P2200	£5.90	£5.70	£5.50
OKI			
80/82	£1.20	£0.90	£0.80
182/183/192/193	£2.75	£2.55	£2.40
OKIMATE 20 Black	£6.60	£6.20	£6.00
OKIMATE 20 Colour	£7.00	£6.50	£6.20
PANASONIC			
KXP 1124	£7.50	£7.00	£6.50
KXP 1540	£10.00	£9.00	£8.00
KXP 1080/1/2/3	£3.95	£3.80	£3.60
KXP 1592/1593	£3.95	£3.80	£3.60
3131/3151 MS	£2.35	£2.25	£2.05
3131/3151 FA	£2.75	£2.65	£2.45
QUENDATA			
1120 MS	£2.60	£2.40	£2.20
1120 FA	£2.90	£2.80	£2.60
QUME			
Sprint 7/9 MS	£2.60	£2.40	£2.20
Sprint 7/9 FA	£2.90	£2.80	£2.60
IV MS	£2.60	£2.40	£2.20
IV FA	£2.90	£2.80	£2.60
RITEMAN			
INFORUNNER	£6.50	£6.30	£6.10
RICOH			
1300/1600 MS	£2.50	£2.40	£2.20
SEIKOSHA			
SP800/SP1000 MS	£4.00	£3.80	£3.60
SP800/SP1000 FA	£3.30	£3.25	£3.10
SP800/SP1000 Blue	£4.25	£3.95	£3.75
SP800/SP1000 Red	£4.25	£3.95	£3.75
GP50	£5.80	£5.50	£5.30
GP80	£2.40	£2.20	£1.90
GP100/250	£2.40	£2.20	£1.90
GP500/550	£2.30	£2.15	£2.05
BP5420	£7.95	£7.75	£7.55
SHINWA			
CP80 MS	£3.50	£2.70	£2.50
CP80 FA	£4.50	£4.30	£4.00
SMITH CORONA			
D100/D200	£4.60	£4.20	£3.70
D300	£2.50	£2.40	£2.15
EL1000/TP1 FA	£5.70	£5.25	£4.95
EL1000/TP1 CO	£5.00	£4.70	£4.50
EL1000/TP1 MS	£12.50	£10.70	£9.95
Fastext 80	£11.70	£11.20	£10.90
SILVER REED			
EXP400/500/550 MS	£3.00	£2.85	£2.65
EXP400/500/550 CO	£2.80	£2.60	£2.40
STAR			
510/DP510/DP515	£1.20	£0.90	£0.80
GEMINI 1X/SG10/SG15	£1.20	£0.90	£0.80
LC10	£3.90	£3.70	£3.50
LC10 Colour	£6.50	£6.00	£5.50
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A4 mentioned

by Chris Laing

Is it worth investing in an A4 monitor? Chris has a squint at Samsung's MP5671 and Watford Electronics' MagicSync models

THROUGHOUT the existence of the IBM PC and its compatibles, there has been an evolutionary development of the video displays that these machines support. The original PC was designed with a simple mono display which had very limited graphics capabilities. This provided an opportunity for a third-party company to produce a high resolution graphics standard, which was suitably provided by Hercules. This standard is still the most popular mono graphics system.

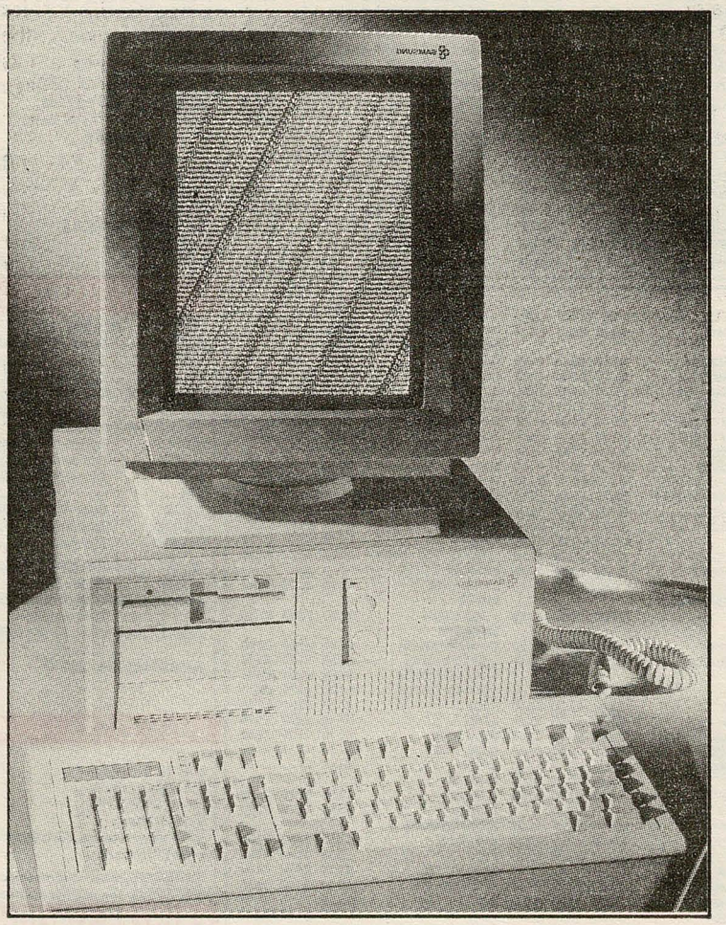
The requirement for a colour display system led to IBM producing the Colour Graphics Adaptor (CGA), which is capable of producing high resolution graphics in mono mode, or four colour graphics in a medium resolution mode. This standard is probably the most prevalent, although it is rapidly being overtaken by more recent developments.

The first of these developments came with the enhanced graphics adaptor (EGA), which had the capability to produce high resolution graphics in full-colour mode. The most recent standard to be generally introduced is an analogue standard monitor VGA, which theoretically has the ability to display an infinite spectrum of colours.

General software support is provided for all these monitors, although there is little specific support for the VGA standard as yet.

Accompanying the development in hardware technology, there have been major advances in the range of applications software that is available, most notably in the graphics field. As advances are made, so specialist requirements are generated for display types. These specialised displays are not, in general, compatible with normal application software and so specific programs must be provided to drive them.

As a result of this development, there is little inherent support for graphics adaptors in the operating system itself. Each display type requires a different set of driving electronics, which normally take the form of an expansion card allowing you the flexibility to adjust the monitor that you are using when necessary. Some computers, however, have the driving electronics built in – the Amstrad range, for example – simplifying the installation and operation of the computer. In order to manipulate the display, a program must, therefore, send information to the controller (wherever that may be). Text display is usually handled by the operating system, so any display that is in any way unusual must have a method of informing the operating system that a different technique must be used to output the information. This is the job of a device driver.



Samsung's MP5671 A4 monitor

The device driver is installed via the CONFIG.SYS file, using a command line similar to:

DEVICE=DISPLAY.SYS

The device driver is then installed into memory and initialised whenever the computer boots up. By nominating the device to be a video driver, the operating system now knows that it must use the device driver whenever it wants to send text to the display.

In order to access the graphic capabilities of a particular interface, software is provided with the video card. The software may take the form of an Eprom located on the card itself, or a disk (or disks) of display driver files required for certain specific application programs.

These programs have a predefined format for their video drivers, allowing third party manufacturers to produce their own video drivers, thereby allowing their hardware to be compatible with the applications program. Examples of programs that support this feature include the *GEM* operating system shell, *Pagemaker*, *Ventura Publisher* and *Lotus 1-2-3*.

The ease with which it is possible to add the display driver depends on the installation process for the application, which usually must be followed and the new display nominated at the relevant stage. Some programs require that you simply modify a configuration file to include the name of the new display driver. Having followed the installation, operation of your new display becomes transparent, with the display driver handling the requests given to it by the applications program.

Why, then, would you want to change your display from one of the more regular 'standards' in the first place? If you have any experience of using a desktop publishing package, the answer is probably quite obvious – greater resolution. Current monitor technology allows monitors to be produced that are capable of displaying graphics to a very high resolution – a factor that is governed by the size of the phosphors on the screen and the density to which the screen is coated. The standards defined for the regular monitors do not include a mode which allows this high resolution to be exploited, hence the specialised displays.

Laying out a page of text on a monitor that cannot display your work to a sufficiently high resolution can be a very tiring process. You must either work on a magnified portion of the text, or tolerate the fact that you can't actually read the section that you are laying out. If you magnify the text, you then reduce the area that you can view on screen at any one time.

Of course, if you had a monitor that not only had a higher resolution, but also a physically larger display area, you could view a greater portion of the finished article all at once. Obviously, this isn't only true of desktop publishing, but also of CAD and any work which involves preparing a picture on-screen.

The main types of monitor that are used to enhance graphic output are either A4 or A3 types – so called as this is the size of image that can be displayed on them. Until recently, the price of this technology precluded their use for the home user and it was only used in a commercial environment. These days, however, you can buy an A4 monitor for around £600 – not a great deal more than you would find yourself paying for a decent VGA screen.

Samsung and Watford Electronics both have A4 monitors in this price range. The Samsung monitor comes with a display driver card that is sourced in the United States from a company called Cornerstone, which is reckoned to be the number one driver card in the states. The Watford monitor comes with a hitherto unknown, or at least

A4 monitors compared

Model name: MP5671
Supplier: Samsung Business Systems,
Unit 1, Hook Rise Business and Industrial Centre,
225 Hook Rise South, Surbiton, Surrey KT6 7LD.
(01) 391 0168
Drivers supplied:
MicroSoft Windows 1.03 or later
MicroSoft Windows 2.0 or later
Ventura Publisher 1,0 or later
AutoCAD v2.18 or later
AutoCAD Release 9
Autoshade
GEM v2.1 or 2.2
Lotus 1-2-3 v2.0 or later (96x63)
WordPerfect v5.0 or later
GEM 3 (via fix)
Max resolution: 768x1008
Current retail price: £899 plus VAT

Model name: MagicSync
Supplier: Watford Electronics, Jessa House,
250 Lower High Street, Watford WD1 2AN.
(0923) 37774
Drivers supplied:
Lotus 1-2-3 v2.0 (132x160 or 80x60)
Symphony (132x60 or 80x60)
AutoCAD v2.5a or later
AutoCAD Release 9
GEM v2.0 or later (800x600, 640x528 and 640x480)
Windows 1.0 or later 800x600 and 680x480
Windows 2.03 800x600 and 640x480
Framework 2 v1.1 or later
Ventura 1.1 or later
Wordstar Prof v5
WordPerfect v4.01
Pagemaker v1.0
Max resolution: 768x1024
Current retail price: £599 plus VAT

unnoticed, card.

Physically, as you may imagine, the monitors are very similar. Both have a cream casing, although the Watford has a grey front plate to it – I'm not sure of the significance of this, but it must be important to someone. The displays are also both paper-white – appropriate, I suppose, for an A4 monitor. Both are also supplied with the relevant cables to connect them up (although you have to put the plugs on the mains leads).

The installation process is similar with both, so the method described applies equally well to either.

Physically installing the cards in the machine is reasonably straightforward. First you must decide whether you are keeping your existing display, or using the A4 monitor on its own. The obligatory set of DIP switches are used to define what mode you are using (once you've managed to decode the manual and decide which way is on and which way is off). It never ceases to amaze me that, amidst all this development, no-one seems to have come up with a method of installing hardware under software control – it would cut down on a lot of nervous trauma and reduce the risk of damaging the hardware that you are trying to set up. The nightmares I've had installing hard disk drives...

I digress

Having configured the dip switches, you simply plug the card into a free slot in the PC and connect up the cables. The next stage involves setting up the machine configuration. If you are using the A4 monitor as your primary display, you must edit the CONFIG.SYS file to include the incantation for the relevant display driver. Once this has been done, you have access to the video via normal software.

Both monitors come with software to allow you to set the display to various different operating modes at the Dos level. If you switch the display into 63-line mode, and you have a word processor that is configurable at the right level, you can use the additional resolution for your word processing needs.

I found that it was quite a boon to be able to view a greater portion of the document you are working on at any one time. Perhaps it's because I could see more of the mistakes I'd made at once.

It is important to stress that it is down to the software that you are using whether you will benefit from the monitor's greater capabilities. The majority of programs won't understand the fact that you are running on a monitor with a greater number of lines and will simply use the top 25 lines on the screen. So, if you are contemplating upgrading your monitor, do make sure that your chosen software will drive it, either inherently or via one of the software drivers supplied.

The real test of the monitors is to try them in a full graphics mode. Aldus *Pagemaker*, the DTP package, is as good a test as any. Installation of the package depends on the system that you are running on – *Pagemaker* runs in a Windows environment and so it is actually Windows that you must install. If you run *Pagemaker* on a PC system under normal Dos then you are actually using a run-time version of Windows.

Both monitors come with software drivers for Windows, so you simply declare the driver by selecting the 'Other' option from the Video displays and then inserting the disk containing the drivers. If all is well, the program should display correctly on the full screen when it is next run and the software will automatically adjust to utilise the greater area.

Two things strike you the first time you use the full graphic display. The first is "Gosh, isn't this clear?". The second is "Gosh, isnt this slow?". This is not surprising – because the program must now re-draw a physically larger area, screen update is noticeably slower. This is a worthwhile point to bear in mind if your computer is on the slow side. The benefits of a clearer screen may be outweighed by the disadvantage of the slow update. However, this shouldn't be the case with any of the newer computers – only if you've got a 4MHz 'real' IBM or suchlike. Mind you, if you did have, you probably wouldn't be trying to stick a bigger monitor on it, would you?

The graphics are markedly different to those on your average monitor. You can read small point type clearly, whereas before it was just a blur. It is also a real benefit to be able to work on a whole page layout at once – when you're placing pictures, or flowing text to fill a space, it is so much easier when you can actually see the effects of the changes you are making on the finished article.

The two monitors are similar in terms of clarity, with the Samsung giving a marginally crisper picture – although that might just be my eyesight.

Both come with an extensive set of drivers for third-party software, with applications like *AutoCad*, *Lotus*, *Ventura* and *GEM* supported. It might be prudent to give the suppliers a ring before you make a purchase, to ensure that an appropriate software driver is available for your application.

I found these monitors very easy to work with. There are those who claim that, because the monitors encourage you to work with smaller typefaces, they are actually harder to use. It would appear to me that, as long as the resolution is sufficient to display the typeface clearly, it isn't any more of a strain than using a normal screen.

The benefits for graphics use are unquestionable; whether it is a justifiable expense depends on the amount of time that you spend using this type of application. If the answer is that you dabble every now and then, it would probably be an expensive toy. If you use this type of software daily then it may well be a necessity.

It's hard to make a choice between the Watford and the Samsung offerings. They have very similar technical specifications and their performance seems to be of an equally high quality. Perhaps it will depend which colour faceplate you prefer! The lower price of Watford Electronics' offering might tip the balance in its favour, though.

Ultimately, you will still need an EGA monitor to get the most out of *Flight Simulator*!

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Scoring with success

by Jon Bates

From instrument to printed copy without a pen in sight. A look at DTP scoring packages. Roll over Bateshoven

THE TIME that it takes for the very expensive software package to be distilled and decanted off into the budget-priced package gets less and less. As *Shopper* readers will no doubt be aware, it was but a few years ago that Desk Top Publishing was the domain of the fresh-thinking national newspapers, and made headlines rather in the manner of Eddie Shar, by meeting the print unions head on.

Now DTP is available for the world, his wife and his micro, with magazines running articles and reviews, and colleges running courses.Graphics packages have followed a similar line, from the *Quantel Paintbox* for pop video graphics, down to the almost give away packages on Public Domain. Somewhere between the two camps of graphics and DTP is music printing.

Opening movement

The first music DTP program I came across was in embryonic form and had been developed by a rather large publishing firm which also publishes music. It was quite smart in that it used a plotter, complete with four coloured pens, to print it out. However, it never really saw the light of day as the development time to cross it over to the humble PC and the subsequent costs were eventually outstripped by other software houses. As you will see, the DTP explosion is now being mirrored in music printing software.

Scoring problems

Music is rather a pain to typeset, and that is putting it mildly. For books that a publisher knows are going to sell for years and years – Mozart piano sonatas, or well-established teaching books – it is a worthwhile investment. The problem is that there are so many symbols to cope with that can occupy virtually any position within the stave (that's the five lines and four spaces to you). Not only is it the individual notes that are the problem; the stems for the notes can go either up or down, and this is not just dependent on which side of the middle line they are. Some music will require stems to go up for the upper notes and down for the lower notes on the same stave – hymns and fugal compositions spring to mind here. More headaches loom when you consider the beams that join the stems, which conform to a variable set of rules, the ties and slurs that join the notes' heads, the phrase marks, not to mention the *crescendo* and *diminuendo* marks which can be of varying length. The bars themselves can be of varying length, the actual spacing of the notes is a matter of skilful judgment and when you throw in the different typefaces for the tempo and expression markings you realise that this is not a subject for the faint-hearted.

There are many other things that I have not mentioned; key and time signatures, sharps, flats and naturals within a piece of music. The problem is compounded when you want to score music for, say, a brass section. What about a string quartet where you need four staves bracketed together with bar lines that match up and the viola uses a funny looking 'C' clef? How about vocal music where the notes have to be above the correct syllable with suitable hyphens in the text and it uses three staves? Orchestral scores, single parts from orchestral scores, repeat marks, rehearsal marks, page numbers, text headings, two verses on one stave, ornaments, and how about guitar chords above the stave complete with the chord shapes?

You'd be absolutely correct in thinking that this is a very large can of worms indeed. And we haven't even got near mixing this with text for say a tutor or folk song book; any sort of book where musical examples are required.

Take a note please

For this lot to be typeset originally was a time-consuming and exhausting affair requiring a real specialist with a huge tray of symbols of differing lengths and sizes to cover every occasion. Hence it was also very expensive. It was in fact a lot cheaper and quicker for a new work to be copied out by hand, a tradition that reaches back hundreds of years. Composers such as Bach and Mozart who were working to exacting deadlines and often, in the case of Mozart, at the very last minute or later, would have a copyist working simultaneously with them. As the music flowed from the pen of the composer, written out for the full orchestra, so the copyist wrote out the individual parts.

Until the advent of music DTP, it was cheaper for a music publisher to use a copyist to make a fair draught of a work – in the case of many modern 'serious' composers they would do this themselves as a cost-cutting exercise since a vast volume of sales was not expected and the basic cost needed to be shaved right down. The handwritten score was then photoset and printed.

In the case of music produced for education, you have the worst of all worlds. The schools are limited on budget, the printer and publisher need to produce very clear copies so that the kids can read from it, and there is the spectre of the Performing Rights Society who will seek and get prosecution of schools and authorities who photocopy the music with subsequent heavy penalties. For the educational publisher, music DTP represents a vast saving. For a school it is a real bonus as any enterprising teacher or pupil can enter the piece, either note by note or hopefully from a sequencer, and print up not only the main score, but the parts for the individual players as well.

Scoring sea shanties

BOBBY SHAFTO

Bobby Shafto's gone to sea
Silver buckles at his knee
He'll come back and marry me
Bonny Bobby Shafto

Bobby Shafto's fat and fair
Combing down his yellow hair
He's my love for evermore
Bonny Bobby Shafto

Bobby Shafto's looking out
All his ribbons flew about
All the ladies give a shout
Hey for Bobby Shafto

Originally, this was a Northumbrian fiddle tune with the words 'Willy Fosters gone to sea', which was popular in the early part of the 18th century. It was adapted to fit the lifestyle of one Robert Shafto who, besides being a shipowner in Newcastle also lived the live of the archetypal 'dandy'.

Robert Shafto was born in 1732 into the Shafto family home at Whitworth Hall in West Yorkshire. His good looks and blond hair coupled with his fashionable tastes in clothes soon made him a dashing figure. His first fiancee, the rich heiress Miss Bellasys, died soon after he broke off their engagement, of a broken heart as legend has it. He then turned his attentions to Anne Duncombe of Duncombe Park and married her. Being a shipowner, he did occasionally go to sea. These brief interludes did not prevent him from living as he saw fit for during the course of their marriage he managed to squander not only his fortune but most of hers as well on what is termed 'high living'.

He was Member of Parliament for Durham from 1760 to 1768 but then mysteriously he changed constituencies and successfully stood as candidate for the borough of Downton in Wiltshire from 1768 onwards. It is at about this time that the rhyme as we know it emerged, probably penned by political rivals. Using the already well known tune, it caricatured Shafto and his life running to five verses in the original somewhat vulgar version, portraying him as spending money on himself whilst ignoring the needs of the common people.

Shafto died in 1797 but the verse has outlasted both him and his reputation.

The combination of music and text using EZ Score and Fleet Street Publisher

Stepping out

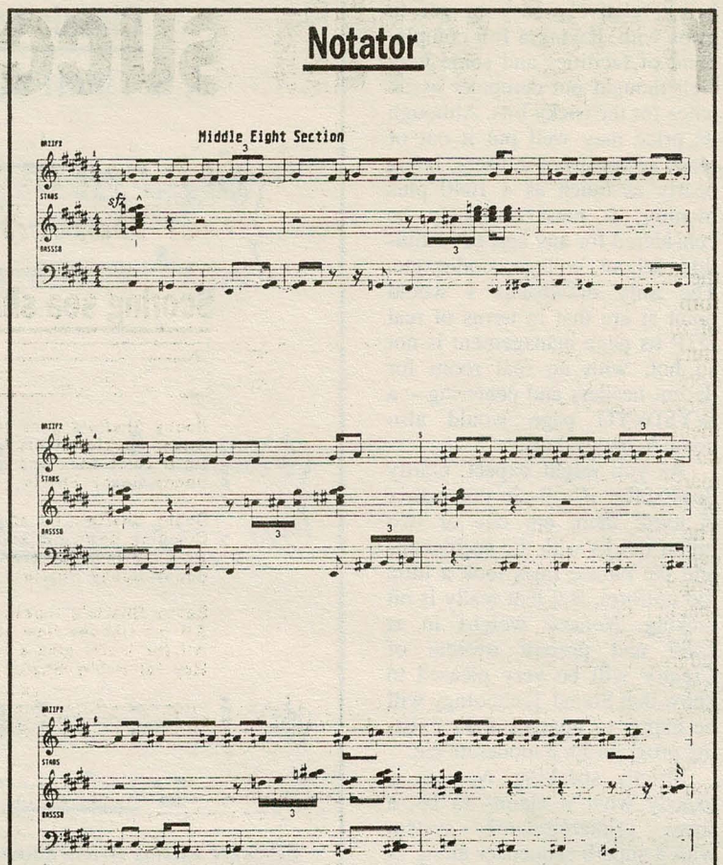
There are several paths to music DTP. At the very bottom there is the program that is really a refined graphics package. The staves are on screen and you pull the notes and symbols from a palette and position them via the cursor. You may well be limited to the amount of stave configurations you can have – that is whether you can only have a single stave, double stave for keyboard music or a multiple stave approach. Even at the bottom end it should be possible for the selected stave or staves to be actually played either from the internal sound chip or via MIDI from a separate instrument. Obviously you would need to be able to scroll through the bars to the relevant point and add or take away notes. Hopefully the printout will be of the whole piece and not merely a screen dump.

At this level even, the 48K Spectrum has a program, *Music Typewriter*, from Romantic Robot. This is capable of these basic functions, the graphics are of excellent quality and only surpassed, in my opinion, by the superior quality of 16 bit machines. However it will only work on one stave and has obvious memory limitations.

The problem with the 'graphics only' approach to music setting is that it requires a very good eye and hand to line up and space the notes. You will also need some way of interpolating the notes with hand-drawn phrasing marks, and text of two or three different typefaces, especially if lyrics are involved. The other major problem is the grouping of the notes. There are various ways and reasons which I won't go into here why notes like quavers and semi-quavers need to be grouped together. To achieve this, and the reason for doing it is always that it should be easy to read, our ideal program should have some sort of auto facility for doing this. These notes need to have their tails 'beamed' or joined together and the number of them that form a group, as I said before, depends on the time value of the notes and the time signature itself.

Other things that our program should do is put in the key signature automatically at the beginning of each line – but not the time signature. It should also be possible to expand and contract the length of individual sections to fit neatly onto the printed page, a sort of justified graphics. It must be remembered that at the end of the day the whole package must be reasonably easy and logical to use, both for the professional musician and the amateur alike.

So much for the graphics only program. The big disadvantage of these is that they depend on the user having a complete editorial knowledge of music. As far as the average user goes, they will appear very slow and, although pleasing to look at, they are not really much better than writing it out by hand. Maybe we ought to look at the next rung up the ladder which is the notation program that works from information fed to it from a MIDI sequencer.

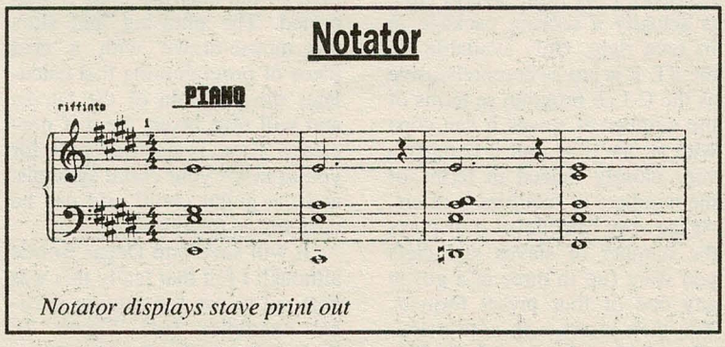


C-Lab Notator getting down to some serious funk scoring

Serious software

Not only have we taken a leap up the ladder, but also made a bigger dent in our credit balance, since the ability to produce printed music from performance, input from an instrument, requires a fair amount of programming. Here also we have to take into consideration the sequencer that the music was originally written on. As most of them store their files in unique formats, the notation package needs, therefore, to be virtually an upgrade of the sequencer itself. Several sequencers have taken the bull by the horns and offer both facilities all in one.

There are several programs that offer notational print outs of the sequences. One of the first that took this step was the Steinberg *PRO 24 Mk 3* that allows the score of each pattern/track to be printed out individually. This was an extension of the *Mk 2* which allowed the user to edit in either graphic or traditional music notation. This officially costs £285, with the new Amiga version costing £250. For a mere £99 the *Track 24*' from Digigram will offer similar scoring facilities, but with less comprehensive editing.



Notator displays stave print out

C-Lab

The other main contender in this category is the C-Lab *Notator* program. Its *Creator* is a serious rival for the Steinberg in the sequencing line, and consequently the upgrade has sought to outdo the latter in facilities. C-Lab certainly seems to have thought of everything, and it loads up tunes of mine made on *Creator* with no problem at all. The package will also allow you to make your own printer driver, which is certainly a good thing, as well as containing a variety of drivers it can default to, including laser. More about printers later on.

Notator is in fact *Creator* plus the scoring software. It is still crammed onto one disk and will score out either all the parts simultaneously as a master score, or it will let you print out the individual parts/tracks, giving each one a name which corresponds to the name of the synthesizer/instrument that performed it – you do this as part of the sequencing routine.

As a scoring package it is very hard to fault the *Notator*. It covers every clef I can think of, and has a palette of nearly every symbol I can think of too! The gaps between the staves can be altered, lyrics inserted, as well as page headings and titles. Just like an orchestral score, the relevant staves can be bracketed together for families of instruments – you could apply this to families of synths as well. Taking advantage of the assignable MIDI split point, it will decide whether or not a double stave for keyboard parts is required. Should you choose to override this, you can alter the split point. By using this carefully, the problem of stems and writing polyphonic parts on one stave is automatically avoided. This can also be achieved by literally tracing the split point on the screen for yourself for individually-defined sections. All, or some of the staves, and their notes can be reproduced in minature for cues or for printing the whole thing on a smaller sheet of paper, getting more onto the paper you already have.

The latest upgrade also has a special section for notating percussion in which you can assign fixed notes and other percussion symbols so that the score is fully compatible with drummers! It combines notation with traditional editing, and it has the accolade of being one of the very few programs that updates the display as you play the notes in real time – methinks there is some mighty fancy programming behind this. For going over the finer editing points you still have the graphic notation in the upper half of the screen or on a flip screen, depending on what you want. C-Lab has also included a 'piano-roll' editor called a 'matrix display' with a piano keyboard spread across the lower screen and a row of descending shapes which actuate the on-screen keys.

Notator gets full marks for

Continued on page 66

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Continued from page 65

being relatively easy to get to grips with, having a full complement of facilities and some very well thought out computer assistance for the tricky bits. Although its price may well put it out of reach of most home users, being nearly as much as a 1040 plus monitor, it must definitely be considered for any sort of institution; school, college, studio, etc. The only drawbacks I would point at are that in terms of real DTP its page management is not so hot; with no real room for decent headers and centering – a WYSIWYG page would also come in handy, lads.

As you might expect, clarity does suffer if a 9-pin dot matrix is used; there are one or two minor quirks with the accidentals and the phrase lines look a little too uniform. But that really is nit picking. *Notator* weighs in at £485 and present owners of *Creator* will be very pleased to know that Sound Technology will be happy to upgrade their existing program for a moderate fee.

Strictly speaking, *Notator* is exactly what it claims to be, a score printer/notation system with a superb sequencer along as well. What is needed for real DTP work is a system that not only can print up the pages of a score but can also store them in a form that can be exported into a DTP package proper. OK you could scan the notation with a digitiser but it's rather like taking a photocopy of a photocopy, particularly if a dot matrix has been used to output the original on. No, what we are talking about here is something like an art package standard like Neo, Image or Degas that any old DTP package can sort out and position on a page. By the most contrived circumstance the next notational package up for serious scrutiny just happens to do exactly this.

Hybrid Arts

EZ-Score Plus from Hybrid Arts, is actually a scoring package in its own right. Only available for the ST, it is not as comprehensive as the C-Lab program in terms of the number of staves it can cope with at one time, but it competes very closely indeed in terms of the numbers of facilities it offers. At the very basic level it displays the number of staves and clefs you want (up to three at a go) in any one of four preset formats. You then insert each note manually, picking them up from flip-up menus. You will have to insert the bar lines manually as well and position the grouping of the notes within the bar. The results can be played back from either the internal chip or a selected MIDI channel.

What it lacks in staves, it makes up for in terms of versatility. It can mix a wide variety of text fonts in with the music in several sizes. The bar size resolution is variable and is pretty sensible when it comes to inserting accidentals. It, too, can cope with percussion notes, although not in as many variations, and without the remapping function. In terms of DTP though, its page mapping, heading and footing facilities are very good indeed. You can indent the first stave on every page, decide where you want the headers and page numbers, print up a title page, choose between single and tractor-fed paper, and generally set up a page layout. These can be stored to default on every reload. It has three print modes if you have a 9-pin matrix, rough, draft, and final, although on a 24-pin only the latter is supported. The phrasing and slurs are mouse-drawn with a neat piece of programming that calculates the parabola of the curves and will also invert them if necessary. There is also provision for you to insert your chord symbols, and the guitar chord grid can be customised to your liking.

It will save into Degas format although I felt that really this was best put to use for quoting musical examples (see Figure ?). Rather shortsightedly, the Degas Save menu option saves the whole screen, complete with the borders and menu headers. Consequently, when you cross this into the DTP there are only a few bars actually of any use. What is needed is an update that displays, say, half a printed page and then saves this. The insert lyric mode cleverly follows the individual notes so that syllables can be dropped right under the correct notes, hyphenating or space will jump to the next syllable. Pretty smart!

However, the program doesn't just act as a pedestrian scoring package. You can, if you want, insert notes from a MIDI keyboard in step time, with some handy options to use controllers such as pitch bend and modulation on the synth to adjust the note values to save you the trouble of running to and from the ST. The real bonus comes if you have access to any of the versions of Hybrid Arts' sequencing packages, *EZ Track* or *Edit Track*. Files created on these can be downloaded into the scoring program and re-quantized to produce a suitable score. Once loaded up, the beams and stems can be flipped and inserted either globally or in defined sections. MIDI channels can be filtered out to prevent possible duplication of notes if parts on the sequencer have been doubled.

Altogether a very worthwhile program that doesn't test the elasticity of your flexible friend and one that should be well sufficient for the average home user.

Make your choice

Scoring packages are available for pretty well all the usual computers and in varying degrees of intelligence and user friendliness. The PC also has programs for scoring, many of which are directly compatible with sequencers, often from the same software house: the same is true

EZ-Score waxing lyrical about Shopper

of the Mac. As you might expect though, the Mac programs lean very much towards the professional end and are priced accordingly

A quick glance at their specs should give a rough idea as to what would be suitable for your requirements, although I would stress that user friendliness and a wide variety of symbols are a must. Before releasing a tight grip on my lolly, I would run through the following checklist:

1) How many staves can it cope with at any time?
2) Does it have facilities to help me align notes and re-size bars?
3) Will it cope with all the musical symbols I need – for example, if you are guitar-orientated, can you print up the chord shapes and maybe make your own up? If you are a string player, are there bowing marks on the palette?
4) If it is not part of a sequencing package, can you load it from another sequencer? Ideally it should accept MIDI format files which will make it compatible with more than one program and software house. MIDI song format is becoming more accepted and lessens the chances of you being stuck with a very unique lemon.
5) Will it work with your printer? If not, can it be configured to work with your printer – and question carefully the too glib answers about future upgrades. What about laser printers and PostScript drivers?
6) Will it 'cut and paste' bars and sections?
7) Is there a choice of printing up either the full score or one single part – often called 'part extraction' or something equally painful?
8) Can it save in a format that a DTP can read directly – Neo, Degas, etc.?

If the program seems to conform to these basic questions then you stand a good chance being able to start on music DTP without too much hair loss.

Here is a quick run through what I believe is currently available – no liability is accepted for those I couldn't find.

For the Amiga, ST and PC, Dr T's *The Copyist* is a fairly easy to use program that will load files from the appropriate Dr T sequencing software. It is available in three versions in ascending order of facilities/cost starting at £79.95. These are from MCM. Although Steinberg owners can use the *Mk 3* version to print out some of the score, there is a complete scoring package for Steinberg sequencers which includes the new *Cubit* software and which will load MIDI files – *Masterscore* coming in at £325

For the PC there are the Passport Designs' *Score* or Encore systems, the *Personal Composer System 2* which includes a 32-track sequencer and laser driver from Jim Miller software and the budget scoring and lyric program *Songwright IV* which was also featured in the April edition of *Shopper*. *Songwright* is a low-cost approach to music printing and has a good range of features at a moderate £75.65. These are available from Computer Music Systems.

The Mac has *Finale* from Coda, *Music Publisher* from Passport and *Music Engraver* from HB. All these are bespoke programs, really aimed at the professional music publisher and carry a hefty price tag to boot. They all really need a hard disk to run them and carry hefty and extensive documentation, but they will do virtually anything and everything you will demand of them. *Finale* is available from MCM at £995 and it is only a scoring package, albeit incredibly comprehensive. *Engraver* is half this cost, but not quite as comprehensive. What links these programs is that they do offer true DTP facilities in the form of sophisticated page layout and saving in graphic standard forms to be exported into other DTP packages. *Finale* is due to be released in PC format soon.

Printers

It goes without saying that you should choose a program that can support your printer. However, you should also look for the ability for the program to drive other maybe more sophisticated printers – you could just get rich quick or find one with an hour or two to spare. Although 9-pin dot matrix is legible you will find that 24-pin, which all our examples are taken from, is far superior. The *Notator* driver was surprisingly slow at kicking the Epson into life and seemed to contemplate its navel between lines, whereas *EZ-Score* fired it up a much faster rate whilst coping with virtually the same task. However, laser printers are fast becoming the order of the day and so it is to those printer drivers that you might need to be looking. All the Mac programs supported PostScript page description which consequently made the final product that much clearer. There are attempts to make a standard music driver language much in the way that the word processor to DTP export path makes use of ASCII. Despite inviting names like *Sonata* and *Interlude* they have not really taken off though. I would hazard a guess and say that the way for easy exporting is to follow the path taken by several of the programs and use an existing graphics format which will be universally accepted. The two DTP pacakages that I tried the *EZ-Score* with, *Fleet Street* and *Timeworks*, worked a treat as can be seen from the example.

Conclusion

It seems that we are in the cross over between first and second generation music DTP. The ground rules have been established by the state-of-the-art programs that have had a long gestation period in the professional publishing houses. The dawn of the second generation is now upon us aimed at the home and public market. What composers nursing the onslaught of arthritis through the ages must have dreamt about is already well-established – from keyboard to printed page without any actual score writing involved.

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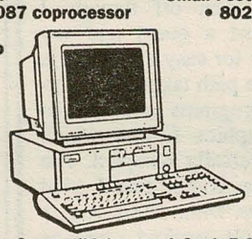

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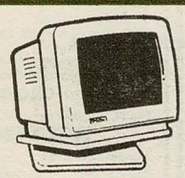

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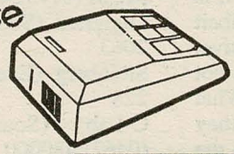

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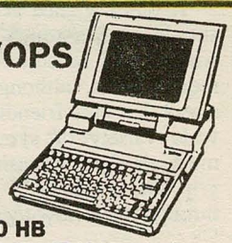

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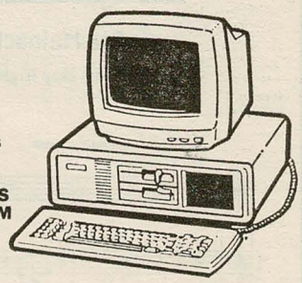

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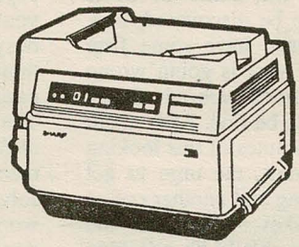

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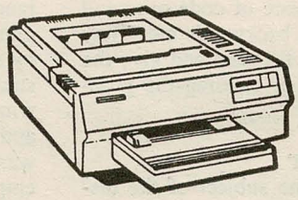

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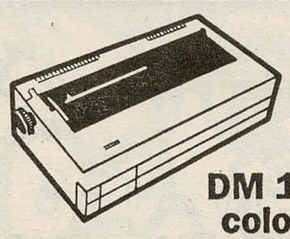

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VISA

When it all goes wrong

by Mike James

Mike looks at the gentle art of debugging. Tips to follow to maintain your sanity include conversing with the waste basket

FOR A change I thought we might take a look at a slightly different stage in the creation of a program – debugging. Most programmers really do think in terms of debugging being a separate and later stage – create program->test program->debug program – but it isn't really.

All the time that you spend creating a program, you are using the same analytical powers to correct errors that you would use in a more well-defined debug operation. Most of the bugs in a program are removed very early in its life, even before they have a chance to be observed in a running program, and this is how it should be. However, many programmers never learn how to debug properly because most of the emphasis these days is on producing correct programs in the first place. Even when testing, debugging, correctness, provability and so on are considered, the ideas often evolve very quickly towards the abstract. What I want to discuss in this article are the basic methods of testing and debugging that we all use, or should use, on every program.

Black coffee

One of the problems with discussing debugging is that there is a very powerful romantic view of the programmer as hero. You know the scene: 'The important program isn't working, so in walks the top programmer – sleeves readily rolled up. He sits down at the desk and starts examining the fan fold listing, occasionally making marks with a fluorescent and very thick fibre tip pen. A pot of black coffee, the main aid to debugging, is occasionally poured into a mug and so the session moves on deep into the night...' Well, if this scene is familiar, I apologise in advance for some of the remarks I am about to make. The man who walks into the room isn't a top programmer. He is clearly a man who likes hard work and long nights and we all know two things about good programmers with absolute certainty – they avoid hard work whenever possible and they have better things to do with long nights.

The reason why debugging is imagined to be this strange communing with black coffee, a listing and a fibre tip pen isn't difficult to discover. It's just an extension of the 'just looking' method of debugging which is so successful and powerful in the early stages. We all use the 'just looking' method. When a bug is turned up in a running program, what is the first thing to do? Go and look at the listing. Usually, from the nature of the bug, you can tell which part of the listing has to be looked at, and if you look at it long enough the bug will jump out and bite you. More realistically, what happens is that you read the section of the program, think about it and how it relates to the erroneous activity that the program displays and the reason for the bug usually becomes obvious. In a sense, the 'just looking' method is a reactivation of the process used in creating the program in the first place.

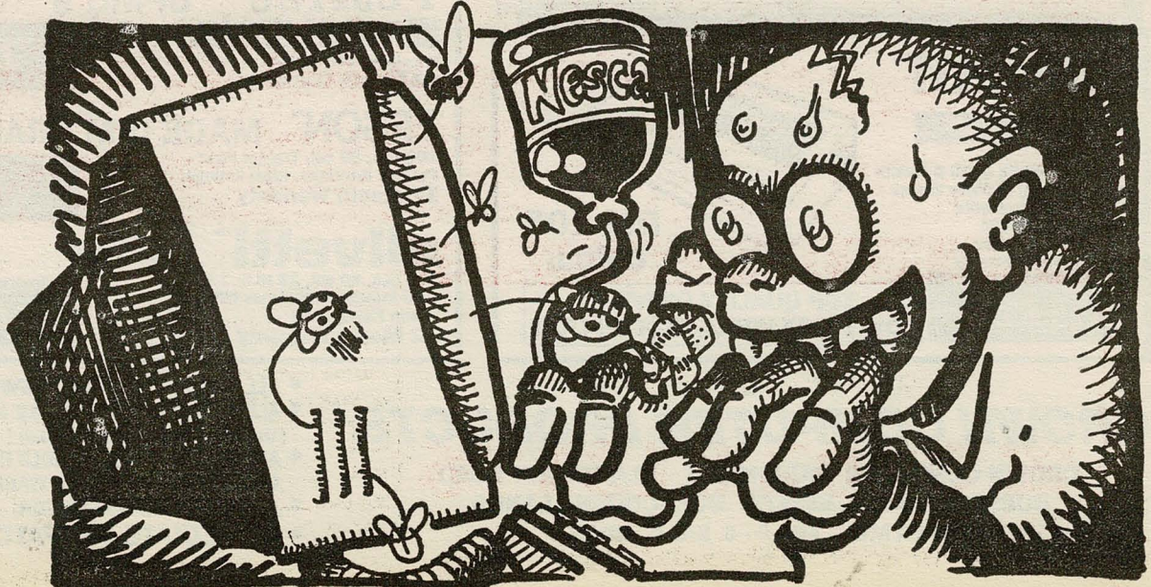
If you think I am joking about the 'just looking' method then I had better state again that it is incredibly powerful and it works in most cases. This is partly a reflection of the fact that the majority of bugs are due to silly little mistakes, inconsistencies or just sloppy thinking, ie most bugs are easy. It is also due to the strange fact that observing a bug can actually improve your understanding of the way that the program works! The success of the 'just looking' method is the cause of many a long night's work of the sort described above. The reason is simply that difficult bugs occur so infrequently that many programmers never have a chance to develop any other debugging methods.

You can always tell when you do have a difficult bug. Usually you look through the listing for a bit, occasionally seeing likely causes that turn out not to be the trouble, or the cause of some other, yet to be discovered, bug. You may even have some firm ideas about what is going wrong but, as you track each one down, it turns out to be fine. After about five or 10 minutes of this looking at the program, the urge to get another listing and another coffee usually strikes – this is the moment you should be watching for because it is the warning light that signals a difficult bug. If the 'just looking' method doesn't work in tens of minutes then the chances are that it will never work, no matter how long you wait – unless you get lucky. After this critical point, much of the observable activity becomes, in the jargon of the psychologists, displacement behaviour. Getting new listings, coffee, looking up obscure facts in manuals, reading the same piece of code over and over again, backwards etc. They all serve to fill time and give the appearance of tackling the problem!

The lister

While on the subject of the displacement behaviours of programmers, my pet hate is the lister. There is always a temptation to get a new listing every time program development reaches any sort of hiatus. It gives the programmer a good feeling, because at least the computer is doing something! Most listings are never looked at and go in the bin, barely thumbed. If you would like to help save a few forests, and a small fortune in paper, try to distinguish very clearly between your need for a paper copy of a program, and your need to keep the computer busy; make it look as if something is happening, or get a few minutes to let your mind run free. The last need is perhaps the most difficult to deal with, because many programmers trying to solve a problem are like a ferret worrying a rabbit – they just don't like to stop. However, the number of times that a solution occurs to people while they are waiting for the latest printout, and so staring vacantly at the fan fold curling on the floor or gazing out of a window, must surely prove that often the real value in getting a listing is the time it gives you, rather than the listing itself. Breaking concentration on a problem for a few minutes can allow the mind to make a lateral jump to a previously ignored approach. All good programmers make use of this fact by spending some time every day staring at a blank wall, out of a window or just taking a siesta and it is about time that this fact was recognised and valued by employers!

Another favourite debugging method that many programmers discover by accident is to explain the problem to another person. In explaining, you have to move away from the program listing and think in a different way about the problem. It can even help if the person you are explaining to isn't a programmer, because then you are forced to an even more radically different level. Indeed,



Continued on page 74

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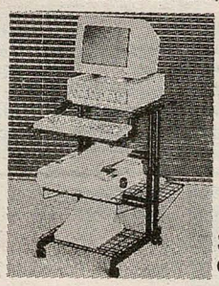

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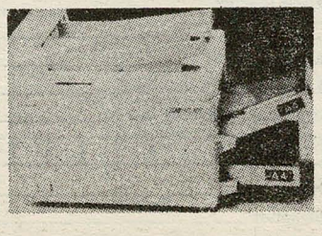

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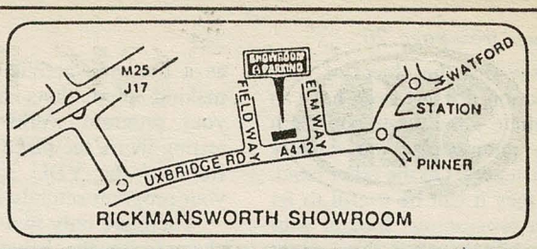

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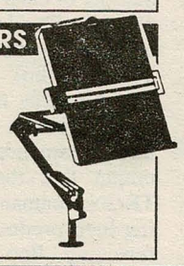

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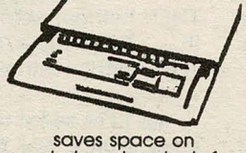

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Continued from page 70

some say that the object of your explanation doesn't even have to be animate – the waste paper bin or the photocopier are equally good listeners. On the other hand, sometimes it can be useful to let another programmer look at your listing. Not because they might be a better programmer or debugger than you, but because they come to the problem fresh and without the preconceived notions of how the program should work.

Debugging actively

The main problem with the 'just looking' method is that it is a fairly passive activity, as is suggested by the continued reference to the use of a listing. There are still two generations of programmers working. The first group learned to program using batch systems and compilers and are used to the idea that you write down your program and examine printouts. The second learned to program using micros and interactive interpreters. The difference mainly manifests itself in the desire to work with paper or the VDU screen. If you try to debug a program from a listing, you can analyse what it does, but you cannot ask any questions. On the other hand, if you see debugging as a dynamic activity involving making predictions about how your program works and then testing them, the place to be is in front of the VDU screen with your program actually running.

There are only two things that characterise the behaviour of a program – the flow of control, ie the next statement to be executed, and the values in the variables. If you predict the behaviour of your program, ie say which statement will be executed next and what the values are in all the variables and then discover you are wrong, then you have found a bug. In other words, logical debugging is a matter of predict and compare, and the first place in the program where your prediction differs from reality is the location of the bug. Of course, it could be that your prediction itself was wrong, but then the question would be: why? Either way, you are almost certain to have found the source of the problem.

It should be fairly obvious how you can predict what a program will do. If you understand the program then you can read it through and follow the logic. However, how do you check your predictions? Most of the answers to this question were invented by the very first assembly language programmers and so much of the jargon is theirs. The primary method of gathering information about what a program is doing is to stop it and look at the contents of the computer's memory and registers. In mainframe days, this used to be called a memory or core dump, and this was another long listing that used to be studied long into the night with a fluorescent marker pen! A core dump was often produced automatically if a batch program crashed, but you could also determine particular points in the program's execution where a dump would be produced. These points were generally referred to as breakpoints, and the whole technique of using them as breakpointing.

Debuggers

Even today, many programming languages only offer debugging facilities that are equivalent to the age old art of breakpointing. You can set a location to reach, or a condition to satisfy, for the program to stop and then display values in variables or memory locations. Most will even let you modify the contents of the displayed variables/locations, although this is more a testing, rather than a debugging, facility.

If you use an interpreter to develop programs then you might not be familiar with the idea of a separate piece of software called a 'debugger'. Interpreters generally allow you to implement your own breakpoints using commands such as STOP, PAUSE or whatever. Once stopped, the program's variables can generally be examined using standard language commands such as PRINT. in direct mode. This lack of explicit debugging facilities often causes beginners not to discover the breakpoint method of debugging, because it isn't described anywhere in a manual!

One feature that most interpreters provide is a trace command. For example, in BASIC, the command TRON forces the interpreter to print the line number of each instruction as it is obeyed (incidentally, this has nothing to do with the Walt Disney film). The command TROFF turns the trace off. The main problem with nearly all trace commands is the volume of output that they produce. One TRON command plus a long lasting loop produces screens-full of repeating line numbers – or,

The Programmer's challenge

THE FIRST thing to say is that the piecemeal triangle was a difficult problem, and as a result the total number of entries was down on problem one. On the other hand, some of you clearly spent quite some time working on the problem and the quality of all the entries was very high. The basic problem comes down to finding a way of chopping up the array into horizontal strips the height of a page, and then chopping these strips up into page-width chunks. Most people attempted to work out the number of horizontal strips and vertical strips needed, and then used a pair of nested loops generate the print out. Indeed at this stage you don't even have to worry about the fact that only the bottom triangle is needed and you can produce some simple code to print the whole array. Something like:

```
hstrip= INT(array_y/page_y)
vstrip=INT(array_x/page_x)
FOR q=1 TO hstrip
 FOR p=1 TO vstrip
  CALL printchunk(p,q)
 NEXT p
NEXT q
```

where printchunk (p,q) is a subroutine that prints the chunk of the array at p sections across and q sections down.

```
SUBROUTINE printchunk(p,q)
 FOR j=1+(q-1)*page_y TO q*page_y
  FOR i=1+(p-1)*page_x TO p*page_x
   PRINT array(i,j);
  NEXT i
  PRINT
 NEXT j
 CALL start_newpage
END SUB
```

There are two problems to with this simple approach. The first is that any fractional pages that are needed to print the entire matrix are, at the moment, ignored! The solution for this is to test for fractional pages and add one to hstrip and vstrip if they exist. That is:

```
IF      INT(array_y/page_y)<>array/page_y
THEN hstrip=hstrip+1
IF      INT(array_x/page_x)<>arrayx/page_x
THEN vstrip=vstrip+1
```

has to be added to the beginning of the program. Notice that the only time a fractional horizontal or vertical page doesn't occur is when the matrix is an exact multiple of the page size. The final problem is that the algorithm described above prints the entire matrix properly paged and we only need the upper triangle. This is easy to solve by simply changing the PRINT statement so that it only prints elements below and on the diagonal. That is:

```
IF i<=j THEN PRINT array(i,j)
```

The only remaining tricky bit is that the algorithm prints blank pages corresponding to the sections of the upper triangle of the matrix. The solution is to set a flag in printchunk to indicate when anything has been printed and only start a new page if it has.

You may object to this solution as being inefficient as it scans the entire matrix when only the lower triangle is required. Some readers submitted solutions that were even more inefficient in this sense by always adding one to vstrip and hstrip so as not to have to test for fractional pages! Some solutions showed signs of not coping with the condition when fractional pages didn't exist, ie, they printed blank pages, but most worked properly.

An alternative solution is based upon direct manipulation of the array indices to keep them within the lower triangle of the matrix and so that they 'visit' the array elements in the correct order is more efficient but tends to produce a more complex looking program.

One nice technique used to good effect by Quentin Pereira in his well structured Mallard BASIC program was the choice of the MIN function rather than the equivalent IF statement. That is:

```
a=MIN(b,c)
```

rather than

```
IF b>c THEN
  a=b
ELSE
  a=c
END IF
```

Even if your language doesn't have a MIN then you can always define a function. Programs that used a MIN function turned out to be easier to read because of the reduction in the number of control structures that this brought about.

worse, the same amount of output on the printer!

Compilers and assemblers usually have an optional debugger, and so the way to go about debugging is usually described in the manual. These days, debuggers have become much more sophisticated, but are still clearly based on the idea of breakpointing. They usually allow you to set a large number of breakpoints and have features such as single step and variable dumps. The most sophisticated debuggers offer a facility often referred to as 'code animation'. Roughly speaking, this means providing a number of different views of the program – for example, a listing with the line being obeyed highlighted; a display of variables with their current values continually updated; a display of the subroutine structure showing how deep in the hierarchy the current instruction is and a display of the stack contents. Code animation is a very easy to use and powerful tool, but it isn't a replacement for the predict and compare method of debugging. The current crop of debuggers are so powerful and easy to use that I have recently come across a new phenomenon. Instead of sitting and 'just looking' at a listing, I have seen programmers sitting and 'just looking' at the results of a debugger animating the program on the screen! When asked what they are doing the answer is usually something along the lines of 'just looking to see if I can see the bug'. There is no doubt that code animation might make it easier to see a bug, but – as in the case of looking at a listing – if it doesn't give results in a few tens of minutes then it is essential to switch to an active and logical debugging method.

Happy to find a bug?

Programmers often talk among themselves about how wonderful their latest piece of work is. Many will describe the difficult bits, the elegant ideas and so on. Very rarely will you find any hint in the conversation that bugs might exist, letalone that they might have dealt with one recently! Programmers don't write perfect programs, no matter what they might like to pretend, and they must all, at some time, have searched for and found a bug.

Some of the best puzzles in computing that I have had to solve have been mysterious bugs in programs. By applying logic to such problems they can be as rewarding and entertaining as program design. When the bug is finally tracked down, the sense of achievement can be equally great. So why don't we talk much about debugging? The answer is simply that it would be an admission of initial failure – a sort of 'didn't I do well, but then again it was my fault in the first place'. Perhaps this accounts for the fact that the only time I hear a programmer describing finding a bug, it is invariably a bug in some other programmer's program!

This is an unfortunate state of affairs because bugs are our most important creations. I can't imagine reaching a psychological state where I, or any other programmer, would be proud of a bug, but we should be proud of how we deal with a bug, regardless of its origin. One software house tried to improve the situation by offering a bottle of champagne for every bug found! The bug detection rate went up, as you might have expected! Perhaps a less expensive method of promoting a better image for bugs is to spread the realisation that, apart from very special situations, bugs are more or less inevitable. This is not a mandate for sloppy programming; every effort should be made to eliminate as many bugs in the design and implementation stage as possible. Even so, the gentle art of debugging shouldn't be treated as if the need to use it was the sign of a poor programmer.

The origin of bugs

There have been many attempts to pin down the source of bugs and many of today's programming methods were designed to reduce the probability of them. The idea was that if a program was clear and simple to understand, then it was less likely to be incorrect. In the same way, modular programming reduces the likelihood of unwanted or unnoticed interactions between different parts of the program. Even so, after all this effort, bugs still remain – and not small bugs. But why is this the case?

People trying to produce perfect programs have generally concentrated on linking programming to mathematics. The reason for this is that mathematics can make logical statements (theorems) that it can prove and which remain true for ever. Now programs are logical statements so, presumably, we should be able to

---

Two readers – M. Gatrell and Quentin Rice, submitted recursive solutions to the problem. A recursive solution wasn't in our mind when we set the problem and I can't say one has managed to find its way in yet! Mr Robert Doughty doesn't claim to be our oldest entrant but at 74 he must come close and easily succeeds in proving that Spectrum BASIC isn't just for kids and playing around. The majority of solutions were written in BASIC, but Pascal, Modula and C each put on a good show. Tim Bierman's program was in TCPL, his own version of BCPL which proved itself a very good language for expressing difficult ideas.

Overall the quality of entries was very high and it was very difficult to choose a final winner. It may be a cliche to say that every entry deserved a prize but it happens to be true. Our only criticism is that the biggest difficulty of the problem was finding a suitable breakdown into modules or subroutines and most of the programs would have been easier to understand if they had been broken down into smaller chunks.

Our final choice was Mr M.R.V Peterson of Nottingham who produced a remarkably clear and simple program that did the job.

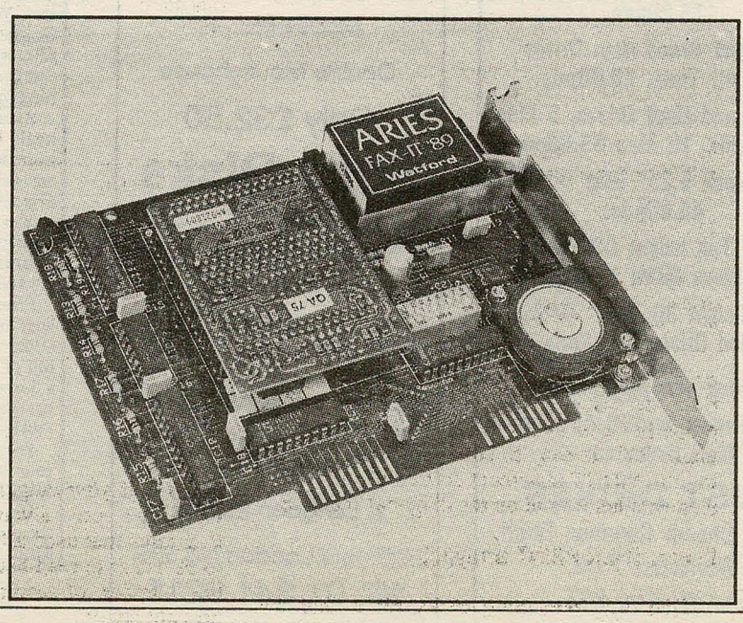
The tick tock problem

Win a fax card worth £200.

This month's Programmers' Challenge is to write a short program that behaves like a clock. It doesn't matter if the program doesn't keep the correct time – you can assume that this is a hardware problem that someone else will fix. The clock should start from a date and time specified in any format that you specify. It should then tick at one second (nominal) intervals and print the time (12/24 hour clock selectable) and the date in words. For example,

1:40:59pm, Monday 3 January 1988

You can use any data representation that you like but no date or time functions that your language might have. You most certainly cannot use any system clock functions either! Remember you only have to make the clock keep time once set – good luck.



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The majority of the last entries were sent by non-PC programmers – draw your own conclusions. With any luck the prize will encourage a great many more PC entries, but don't be deterred if you are using another computer. In the event that the fax card turns out to be useless to you, because you have a QL or like, then trust us to replace the prize with something of near equivalent value which is more relevant. There will also be some runner up prizes of the special *Shopper* Guru mugs, a gift to be cherished for all time since it will mark you as a person of some standing.

Since we forgot to publish Watford's number in the fax review, or even identify them as the supplier of Aries kit, this is our chance to make amends. Fax It! costs £199 and you can get details on (0923) 37774.

The closing date for entries is June 15 1989.

Continued on page 76

Continued from page 75

prove them 'true', ie bug-free. This turns out to be difficult for a number of reasons, but perhaps the toughest is that, unlike mathematics, the variables in a program change. For example, if you see the statement IF A=0 THEN in a program then it is clear that the truth of A=0 depends on the past history of the program and cannot be deduced by a simple reading of the program text. Even so, methods for checking the accuracy of a program using logical proof have been developed. An alternative approach is typified by the language Prolog, where variables never change once they have been assigned a value! "How can this be?" I hear you ask. Well, the answer is that variables are always assigned their final value and, if this isn't known instantly, backtracking and recursion are used to find it before the program moves on. It is a strange way to program, but very good once you get used to it.

At the moment, none of the formal methods of proving a program to be correct work for large programs and there are people about who say that, even if they did, it wouldn't be the last word in getting rid of bugs. The reason is that, even if a program does exactly what it is supposed to do, you may not have thought of all the things it will be required to do! This is the specification bug and it is becoming more important. For example, suppose you have written a program to control a two-seater fighter jet. You may have reasonably decided that in operational service, if one pilot ejects then the plane is in danger, so the other should be automatically ejected as well. After all, there is never a case where only one of the crew should eject. The error is only discovered when the time comes to test the ejection seat. Allowing for the unexpected is part of the programmer's skill, but it is difficult to see how it can be perfected.

Programming is a very recently-invented activity and we are doing better all the time, but the quality of our products still leaves a lot to be desired. So far, we have tackled bugs in a round-about way by finding methods that make programming easier, but perhaps the time is close when the problem should be tackled head-on. As our programs do more and more complicated things, because programming itself is easier, the potential for serious and subtle bugs grows. Clearly some kind of breakthrough is needed.

Mike James is a technical author and programmer. Having bought into coffee in the late 70s, he can afford a very nice lifestyle

The bug hunters' code

- Most bugs are simple and can be found by examining the listing and thinking logically about what your program does and how the bug could possibly arise.
- If the above doesn't work within a few tens of minutes then switch to logical debugging, using the predict and compare method.
- Get, and learn to use, the best code debugger available – your time is more valuable than any cost.
- Use the code debugger, but never use it as a replacement for your own logical powers of debugging. A debugger HELPs you find a bug, rather than finding bugs on its own.
- If the bug is particularly difficult then spend some time in 'meditation'.
- If meditation doesn't help, explain your program to a suitable potted plant – human or otherwise.
- Don't be too proud to let another programmer examine your code in an effort to find a bug. Don't give them too much information about what you have found out so far – they should retain your misleading biases.
- Try to enjoy your bugs. When you find one, concentrate on how clever you are to have found it, not how dim you were to put it there in the first place.
- Don't blame the hardware.
- Debugging is more tiring and requires more energy than programming, so never work on a problem too long – lock it away and go and enjoy yourself.

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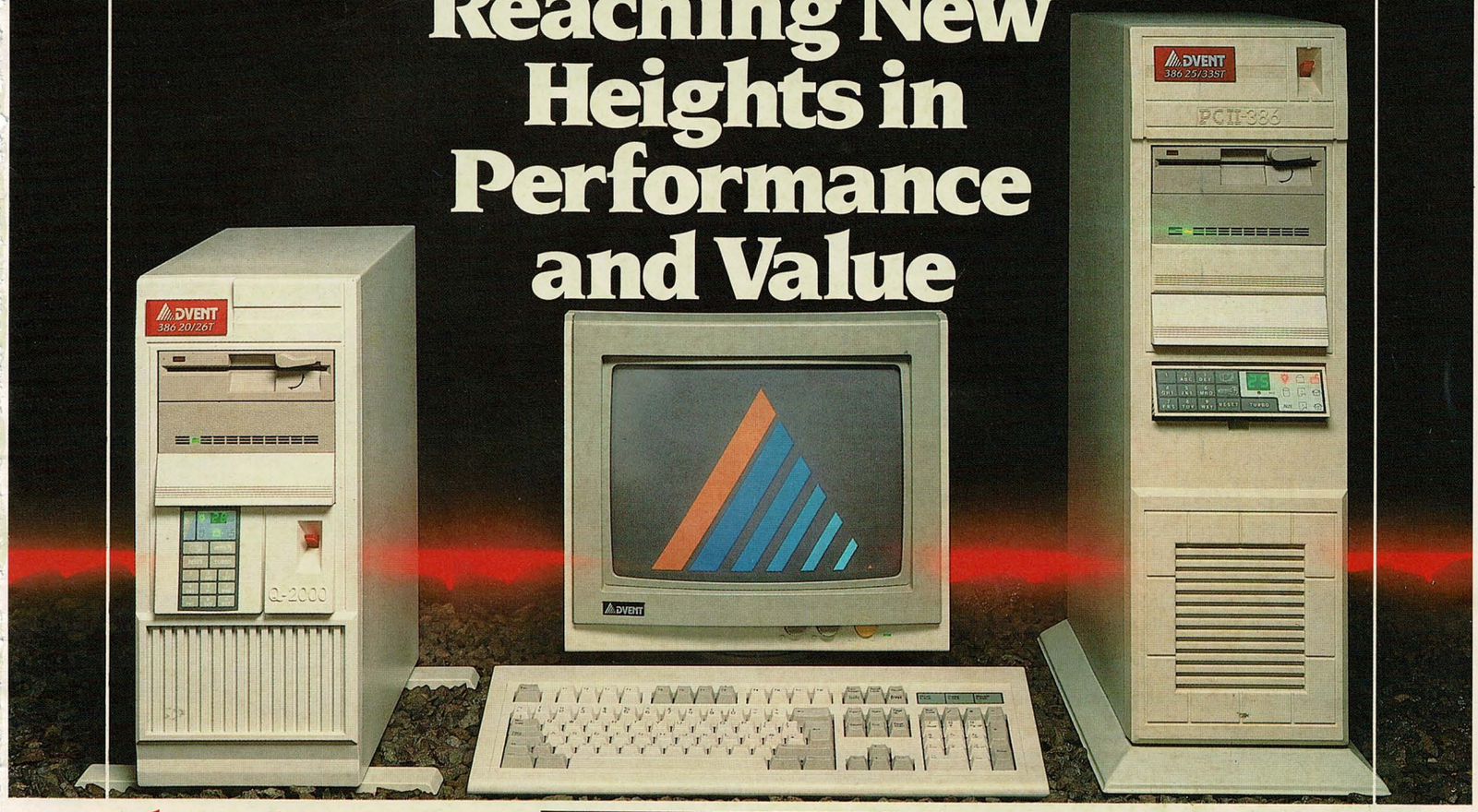

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Floppy Drive	5.25"/1.2Mb	3.5"/1.44Mb

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- 2 Parallel Ports
- 2 Serial Ports
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- Keypad Password Lock
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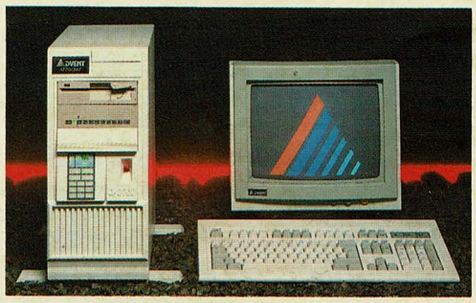

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Hard Disk	30Mb	40Mb	20Mb	30Mb	20Mb	20Mb
Keyboard	102 Key	102 Key	84 Key	102 Key	84 Key	101 Key
Processor Speed	10 MHz	15 MHz	10 MHz	8 MHz	8 MHz	10 MHz
Expansion Slots	8	8	3	4	3	5
Drive Apertures	4	4	2	3	2	2
MS-DOS	Inc. Free	Inc. Free	Extra	Inc. Free	Inc. Free	Inc. Free
GW-BASIC	Inc. Free	Inc. Free	£60.00	Inc. Free	Basic 2	£95.00
8 in 1 Integrated Software + Menumaker	Free	Free	Extra	Extra	Extra	Extra
12 Months on-site Maintenance	Inc. Free	Inc. Free	Extra	Extra	Extra	Extra
Floppy Disk	5.25"/360K	5.25"/360K	5.25"/360K	3.5"/720K	5.25"/360K	5.25"/360K
System Memory	640K	1024K	768K	640K	640K	640K
Parallel Port	2	2	1	1	1	1
Serial Port	2	2	1	1	1	1
Co-processor Socket	Yes	Yes	No	Yes	Yes	Yes
Full size XT Style Case	Yes	Yes	No	No	No	No
Keyboard Lock	Yes	Yes	Yes	Yes	No	No
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Hard Disk	20Mb	40Mb	30Mb	40Mb	44Mb	20Mb
AT Style Keyboard	Yes	Yes	Yes	Yes	Yes	Yes
Processor Speed	12 MHz	12 MHz	10 MHz	12.5 MHz	12 MHz	10 MHz
Expansion Slots	8	8	8	6	8	8
Drive Apertures	4	4	3	4	4	3
MS-DOS	Inc. Free	Inc. Free	Extra	Extra	Extra £39	Inc. Free
GW-BASIC	Inc. Free	Inc. Free	£60.00	£65.00	Free	Inc. Free
8 in 1 Integrated Software + Menumaker	Free	Free	Extra	Extra	Extra	Extra
12 Months on-site Maintenance	Inc. Free	Inc. Free	Extra	Inc. Free	Inc Free	Extra
Floppy Disk	1 x 1.2Mb	1 x 1.2Mb	1 x 1.2Mb	1 x 1.2Mb	1 x 1.2Mb	1 x 1.2Mb
Standard System Memory	640K	1Mb	1Mb	640K	1Mb	1Mb
Max Memory on Mother Board	4Mb	4Mb	1Mb	4.6Mb	1Mb	1Mb
Parallel Port	2	2	1	1	1	1
Serial Port	2	2	1	2	1	1
Co-processor Socket	Yes	Yes	Yes	Yes	Yes	Yes
Keyboard Lock	Yes	Yes Password	Yes	Yes	Yes	Yes
Mono Version (RRP)	£995	£1249	£1295	£1549	£1349	£1995
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Psyclapse (01) 727 8070
Amiga, ST £19.95. Joystick only.
Ballistix is essentially *CrossFire*, that ancient all-action board game which involved blasting ball bearings at a rubber puck to direct it into your opponent's goal. Now it's been suitably modernized by Psyclapse with the addition of a cosmic setting, hyper-kinetic sprites and extra features like bombs, shields and traps on the 80 scrolling levels.

There's a choice of one- or two-player modes. The one-player is boring. You play, on a tilted pitch, against a puck which inexorably slips towards your goal. The two-player mode brings *Ballistix* alive. A sweaty battle of reflex and reaction ensues. Good fun. One-player: 52% Two-players: 73%.

INTERNATIONAL KARATE PLUS
Activision (0734) 311666
Amiga £14.95. Joystick essential.
International Karate Plus places you inside the starched folds of a karate rookie's gi as he endeavours to ascend the martial arts ranks for that elusive award – the black belt. There are 16 rounds of combat to wade through. You are required to fight not one, but two opponents simultaneously per round. Between every two levels is a bonus screen, involving either the booting of bombs before they detonate or the deflection of an endless onslaught of bouncing balls with a shield.

The 16 fighting moves are achieved on one joystick, using a combination of all eight directions with and without the fire button pressed. Moves include the usual flying kicks, front kicks, leg sweeps and punches as well as the more unconventional techniques such as headbutts and groin-strikes. All are accompanied with eye-wateringly realistic crashes, thuds, and, hopefully, groans.

The on-screen karate students are animated fluidly and collapse, clutching their crotches, most realistically. Away in the background an oriental sun sets over a rippling paddy-field, oozing with atmosphere. Owing to the programmers' eccentricity, spooky things happen while you play: a periscope slips up from under the water; a pac-man rolls by...

Success comes with mastering memory, reflex and timing The changing strategies of your opponents ensure that there's no repetition. There is also a two-player option; you and a friend can take on a single opponent or, more likely, each other.

IK+ is superbly presented, has an excellent backing track, very good graphics, and is very addictive. 93%.

BARBARIAN II
Palace (01) 837 7032
Amiga, ST £19.95. Joystick only.
Set against a Paleanzoic backdrop, this game places you in control of a bulky Conan character as he marches, trusty broadsword in grizzly hand, in search of his winsome maiden, snatched from him at a key moment in their relationship by the evil warlock Drax.

To achieve his aim, our hero must comb the rugged landscape for objects and entrances to the catacombs. Pot-bellied dinosaurs and monsters attack him continuously. Our hero dispatches them with a combination of swiping sword moves controlled by one joystick (in a similiar way to *IK+*).

The graphics are outstanding. The barbarian swaggers and fights against the colourful landscape with amazing smoothness and there is a brilliant sequence when our hero meets his demise by having his head chewed off by a dinosaur. He sags headless to his knees while his devoured head is seen making its way down the dinosaur's throat.

Speed is of the essence in this game. Hanging around too long results in the appearance of yet another foe, about 10 seconds after you dispatched the last one. But the promise of more levels and more creatures to contend with keeps you at it. 75%.

TERRAMEX
Grandslam (01) 247 6434
Archimedes £24.95. Mouse needed.
This game is set in a strange world of platforms and ladders, stuffed with bits of fairy tale settings and legendary creatures. You play a foreign character (chosen from a list of five Europeans) who must save the world as we know it by running about the aforesaid strange world, which is fraught with monsters and peril, interacting with objects and characters.

The mouse arrow is permanently on screen. Movement in any direction is achieved by moving the arrow to the place you want to go and clicking the mouse button. Your character does his best to comply, jumping gaps or climbing ladders, but he may even refuse if you push your luck.

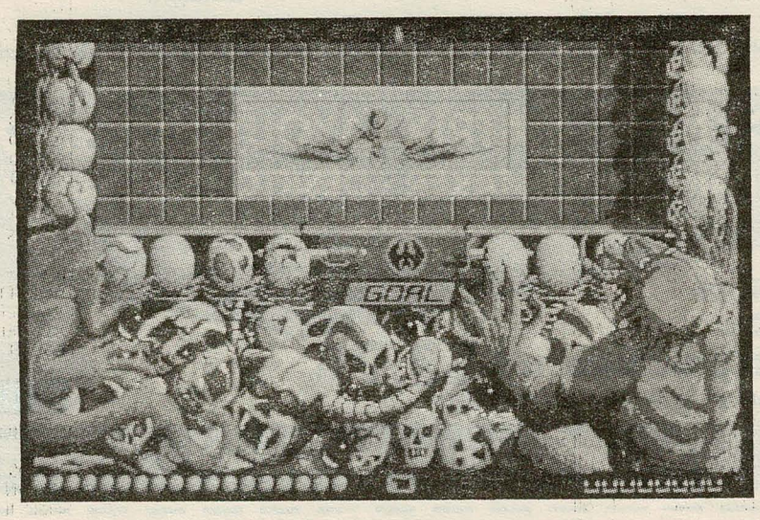
Terramex Archimedes is a good example of the potential of the machine against its famous 16-bit rivals. It's not revolutionary though; it won't stun people into buying an Archimedes on the spot. But it is well executed and smooth, the graphics are detailed and colourful, and it's addictive enough to keep any of the persecuted owners happy. 78%.

PRISON
Chrysalis (0709) 370102
ST, Amiga £19.95. Joystick only.
Prison is an arcade adventure with a futuristic Cyberpunk storyline and graphics to match. You play Jag Edwards, framed narcotics cop, who has been wrongfully incarcerated on the prison-planet Altrax. Convinced of innocence, Jag sets out across the alien-infested, warped landscape of the planet, seeking the escape pod from a crashed space cruiser.

The planet is split into several sectors. You must visit all of them if you want to succeed. Only by interaction or experimentation with the objects that you find lying about can you escape each sector. At first, the puzzles are very simple: a locked door with a security pass slot. It's obvious that you have to find a security pass. But the issue is confused by the existence of too many red-herring objects which can irredeemably ruin your chances in the game. It's very much a case of saving the game and trial and error. You also have to negiotiate hostile aliens, yawning chasms and booby trap mines.

The graphics are excellent and stylish, with each screen bursting with colour. Jag animates very well, but walks very strangely, as if he keeps all his innocence up his backside. The progressive difficulty of the problems, the lure of more levels and the overall ease of use maintains the player's interest. 85%.

Ballistix



Ballistix is essentially an ancient all-action board game which has been suitably modernised with the addition of a cosmic setting, hyper-kinetic sprites, bombs, shields and traps

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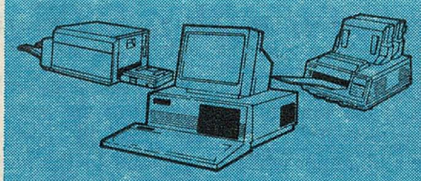

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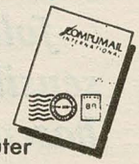

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Get into print with GEM

by Graeme Kidd

Release 2 of Digital Research's Desktop Publisher gets the full treatment. Do the people who brought you GEM know how to get the best out of it with a DTP package?

THE ORIGINAL version of Digital Research's *Desktop Publisher* was a meaty package in its own right, but had a number of shortcomings for the budding media tycoon, principal amongst which was the lack of an option to word process directly onto the page. The latest version solves this problem, adds new features, and offers worthy competition to packages like *Finesse 2* and *Timeworks*.

GEM DTP follows the sensible, frame-based approach to on-screen page makeup and offers the facility to produce text and certain graphics elements in up to fourteen colours as well as boring old black and white. Like *Timeworks*, you only draw one type of frame onto the page – either graphics or text can be placed into an empty frame, or 'rectangle' as *GEM DTP* refers to them. At the start of a layout session, the size of the page image is defined: if inches are chosen as the unit of measurement, the page can be 10" x 8" or 8" x 13"; choose centimetres and A4 or A3 documents can be created. A further option allows designs to be prepared in landscape or portrait formats, but the output device you intend to use will play a large part in the decision-making at this early stage.

With *GEM DTP* fired up and ready to go, the screen display reveals, unsurprisingly, a typical *GEM* application user interface. Which is the posh way of saying that pull-down menus at the top of the screen are available, and that there's a work area which shows the page being created with a toolbox area to the left.

Five icons determine which tool, and hence which mode of operation, is currently selected. Each mode tool allows the user to undertake a group of activities, and making a selection in the toolbox governs the effect of the mouse pointer on the page and gives access to a subset of the options from those available in the pull-down menus. A panel of toggle switches in the toolbox area allows the page in the work areas to be viewed full size on its own, full size as one of two facing pages, actual size – referred to as 'normal', and double size, which is handy when making those intricate little adjustments. Similarly, rules at the top and left of the work area can be toggled on and off.

To make life a bit easier while moving around on a page, selecting a panner tool switches the display mode to full page and shows a rectangular box superimposed on the artwork – move the box to the area of the page you want to take a closer look at, and the display returns to an enlarged view with the selected section of the page in the work area. Finally, the toolkit is completed by a Mini-Selector, which is a small *GEM*-style dialog window used to access text and image files, and to manipulate styles.

The basic approach to creating pages in *GEM DTP* involves drawing non-print frames on the page in the work area and filling them with text or graphics. Select the frame drawing icon in the toolbox, and the mouse cursor changes to a crosshair when it is moved over the work area. Using the rules, or by activating the 'show position option' which displays the cursor position as x and y co-ordinates relative to the origin of the page, it is possible to place the cursor at an exact position in the work area. Click on the mouse to start drawing a frame, hold the button in while moving the mouse and the frame rubber-bands open from the top left hand corner. Release the mouse, and voila: there's a new frame on the page. Only one frame is active at a time, and the current frame grows four handles – one at each corner – which can be used to change the size and shape of the frame once move mode has been selected. For some reason, the programmers have not included handles on the sides of frames, which means that elongating a frame by moving just one side horizontally or vertically is a little more tricky than it need be. A 'show size' option can be activated, which displays the horizontal and vertical dimensions of the active frame.

An invisible grid can be set up on the page, and the space between grid points specified by the user – a 'snap to' facility operates while the grid is active, which helps to align frames. It would have been a little more user-friendly to have had the grid as a visible overlay on the page, so the user can see exactly what is happening: it can be a little confusing when frames start hopping around on the page as they are moved.

Once a frame has been drawn, sized and moved bodily to the right place on the page, it can be filled with a background pattern and set to 'opaque' or 'transparent', which affects its behaviour in relation to other elements on the page. An opaque frame drawn inside a frame containing text, for instance, will repel text, causing automatic text runaround, while a transparent frame will behave as if it was a transparent overlay lying on top of the text. Fiddling with frame attributes gives access to certain effects – for instance, white text out of a black background is achieved by drawing a frame, filling it with solid black, then keying in some text which as been set to 'white' as a character attribute. Up to four columns can be defined within a frame that is to be used to hold text, and vertical rules between the columns can be toggled on or off.

Pasting up pages

GEM DTP now allows text to be keyed into a frame directly – select a frame, change to text mode by clicking on the T icon in the toolbox and the mouse cursor becomes an I beam. Before keying text into a virgin frame, the system asks you for a filename – *GEM DTP* 'assembles' documents from workfiles, and needs a name for the files which make up the elements of a page. Once the new filename has been

Take two girls

Importing the same image into two non-printing frames on a page which will have two columns of text and a vertical rule separating the text. On the left, the frame has been made transparent and filled with a grey pattern; on the right it has been left filled with the default white and made opaque, which is why it obscures part of the vertical rule

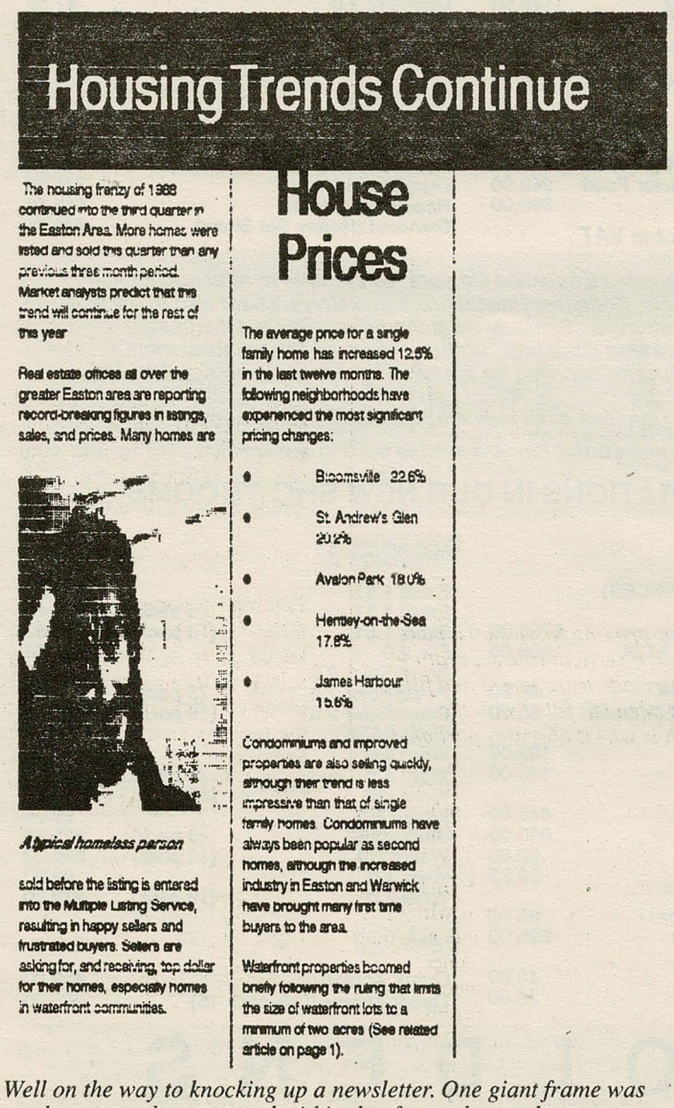
GEM DTP follows the sensible, frame-based approach to on-screen page make up

entered, it appears in the Mini-Selector, and the characters you key into the frame can then be copied into other frames or saved out of the document as a text file. The usual mouse-driven editing system is used to highlight blocks of text which may then be cut, copied and pasted.

It is generally more convenient to prepare longer stories in a word processor and then import them to the page. When a text file is imported, *GEM* can run it through one of the filters that convert the format commands used in particular word processors into *GEM DTP* formatting instructions (more of them later), or it can import a straight ASCII file. Either way, a copy of the text is stored as an ASCII file associated with the document and its name appears in the Mini-Selector. Once a file has been stashed in the Mini-Selector, you can proceed to pour it into a frame or sequence of frames in the document – which is where things can get a little bit tricky.

GEM DTP departs from the linked-frame approach to flowing text files onto the page. Click on an empty frame and, providing it is large enough, all the text will pour into it. To split copy between two frames, click on the first frame and as much text as will fit pours in. Click on a second frame, and as much of the overflow as will fit pours into that. Now here comes the slightly tricky bit. The order in which the copy flows into two such frames is determined by their relative position on the page, rather than by a link set up by the user. According to the manual: 'The general rule is this: Text flows first into the rectangle whose top left corner is higher on the page, even if the difference is only a fraction of an inch. If the top left corners of both rectangles are equally as high on the page, then text flows first into the rectangle on the left.' This is a sensible enough approach to flowing copy onto the page, but as a way of working it isn't as obvious as setting up chains of frames into which text is then poured. Tricky moments with copy flows can result if the design is amended half way through a session.

First step to a newsletter



Well on the way to knocking up a newsletter. One giant frame was used to set up the page, and within that frame three columns separated by vertical rules were defined via the Frame Options facility. Text was poured in, then an opaque box drawn for the picture, which is a .IMG file supplied by Vidi PC. Another frame was drawn below the picture into which the caption was typed. The reversed out headline was created in yet another frame, which was filled with solid black, set to opaque so it forced the body text to start where it does. The headline was typed into the black frame as white text and then the 'space above' value altered so as to centre the line vertically in the box

Stylish text

Like *Ventura* and *Timeworks*, *GEM DTP* uses a style sheet approach to formatting paragraphs of text, and style sheets may be moved between documents. The default paragraph style is Body Text, but by selecting a paragraph on the page it is possible to copy the style sheet assigned to it, rename it, and create a new style. All the styles currently available in a document are shown by name in the Mini-Selector when the Paragraph tool is selected, and individual paragraphs, or runs of paragraphs, can be put into a style by selecting text and clicking on a style name.

A style controls four elements: the character attributes of text; the way in which text is formatted on the page; the approach taken to hyphenation; and the position and effect of tab stops. Selecting the paragraph mode and choosing a style name from the Mini-Selector gives access to the options lurking behind the pull-down Style menu, which can be customised to your heart's content and saved against the selected style name.

The character attributes of text associated with a particular style may be defined via the character menu. The user can dictate the point size, type-style – that is, bold, medium, italic and so on – and the colour of text. An automatic underline mode may also be toggled on or off.

Up to 16 tab stops can be set up for a style, and each of them may be defined so that text is tabbed to the left, right, centre or aligned on decimal points at the tab position. An offset value, measured from the left hand edge of the text, is specified for each tab stop, and should you later change the left indent for a chunk of text, the tabs automatically move to preserve their relative position with the left indent.

Hyphenation may be toggled on or off, and the software supports hyphenation conventions in eight European languages – so if you're putting together a newsletter in Swedish, there's no need to worry about offending your readers with inelegant or nonsensical hyphenations. To make the whole process of hyphenation as painless as possible, an exception dictionary may be created, either by preparing a file of words that you don't want hyphenated under any circumstances and feeding it in, or by adding and deleting individual words in a window called onto the screen. Soft hyphens can be inserted in text, offering the program suggestions for splitting words – but they are only suggestions which are acted on if the word has to be split. No control over the parameters used by the hyphenation algorithm is offered, however, so on control of hyphenation *Timeworks* still leads the field with its options to define the 'hot zone' for splitting words – its facility to set up parameters for the length of words which may be split and where hyphens may be inserted.

Finally, paragraph attributes govern the layout of text on the page. Indents to the left and right of text may be specified for a style, along with an indent value for the first line in each paragraph. The line spacing, or leading between individual lines in a paragraph can be entered, as can a value for the additional line spacing before and after each paragraph. And typographically inclined users will be pleased to know that *GEM DTP* can be set to work in picas and points... (A toggle switch can be set to ignore space before and after paragraphs, which can be useful when aligning the first and last paragraphs in a document, or getting headlines to appear in just the right place vertically). Naturally, text may be ranged to the left or right, justified or centred, and for special effects or just to squeeze that extra word or two into an article without going to another line, the tracking value – which governs the letter spacing – can be altered. Kerning is also offered, but as a separate function rather than a part of a style set-up.

Working with style sheets in *GEM DTP* can save a great deal of time and effort. As an example, if you were designing the layout for a parts catalogue which included text descriptions for items together with tabbed price and part number information, then styles for section headlines, descriptive text and item names and tabbed price/part number information could be set up. You could fiddle around on screen with one example entry, keyed in directly, and once a pleasing layout had been arrived at, the styles could then be saved as a stylesheet associated with the design document. If the text for the catalogue had already been keyed in to a word processor file, it could then be imported into the template and formatted

Continued on page 87

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Continued from page 85

very quickly – just a matter of going through the page, clicking on paragraphs and assigning the appropriate styles to them. A 10-minute job for a two-page catalogue – and, of course, every time you wanted to produce an updated edition, pouring text in and assigning styles would take another 10 minutes or so and the end result would be in exactly the same format as previous versions of the catalogue.

The real timesaving element of the stylesheet way of working comes when a huge document is being prepared to an established design. Imagine the tedium of importing unformatted text for a two hundred page catalogue, and then having to go through each individual item entry assigning the right styles. *GEM DTP* offers an elegant solution to this problem in the form of embedded codes, which can be entered in the textfile before it gets anywhere near the page.

When the text for such a 200-page catalogue is keyed in down in the word processing department, style names can be keyed in along with the copy. Providing the '@' symbol precedes a style name that will be present in the *DTP* catalogue document, when the text is imported *GEM DTP* automatically puts all the text that follows a stylename into the style identified by that stylename until it encounters the next '@' stylename command. Providing your word processor stores the ASCII tab character for a tab stop, *GEM* will also tabulate information according to a style.

Format commands such as bold and italic text also come across with text imported from a word processor, providing it is one of the word processors that *GEM DTP* supports in this way. All the command codes are listed in the manual, however, and even if there isn't an on-board filter for your word processor, you can still insert embedded codes which *GEM DTP* will recognise and act upon.

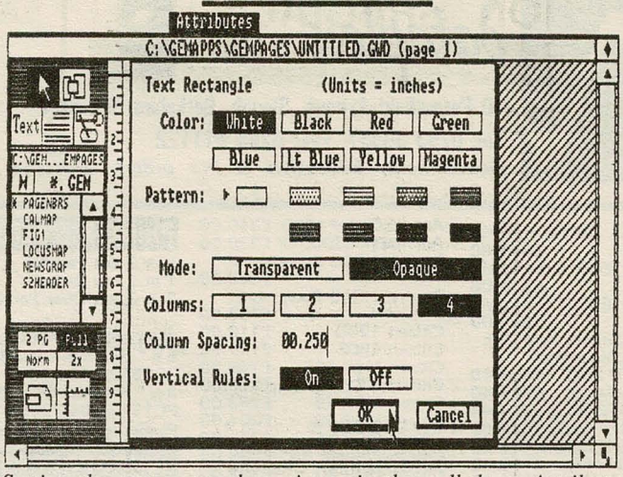
Grabbing graphics

Two types of graphic file can be incorporated in a *GEM DTP* document – those with .IMG extensions, and *.GEM* files. Draw a frame, choose a graphic file in the Mini-Selector, and in a few moments the image appears on the page. Images may be imported in 'best fit' mode, in which case the entire picture appears in the frame, centred – this may mean that the frame is not filled, but as the aspect ratio of the picture is preserved, the image is true to the original.

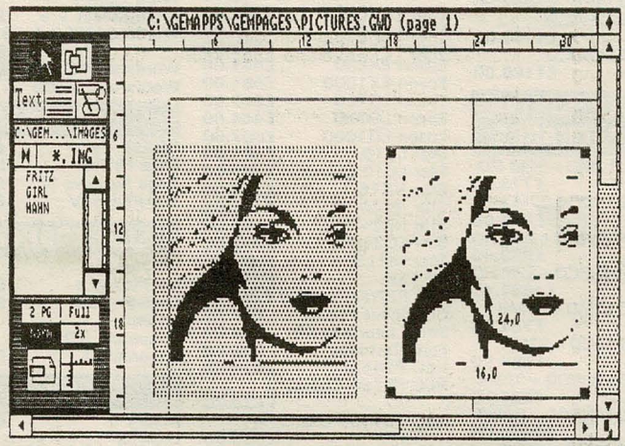
Alternatively, it is possible to alter the size of the image manually, by keying in a percentage value for the size as compared to the original. Values for the horizontal and vertical alignment can also be supplied for an imported image. It takes a little working out, but it is possible to create effective crops by fiddling around with the sizing and scaling parameters – but if you want to import a detail from an image, it might be easier to revert to an art package, edit the picture and save the selected portion in a file for export to a *GEM DTP* page.

Lines and boxes may be drawn into frames as graphic elements to titivate the page – it's best to put them into their own frame and make the frame 'transparent' if you want to move them around the page, as a graphic element is associated with its parent frame. If a line is drawn in a frame containing text, it moves with the text as you shift the frame around on the page. Like frames, closed graphic elements – circles and boxes – can be filled, using the eight fill patterns supplied and, if your output device is up to it, pretty colours may be used. Interesting effects can be achieved by backfilling a frame before importing a picture – the fill pattern can be made to appear around solid elements in a *.GEM* file, or as an underlay or border around the edge of a .IMG file.

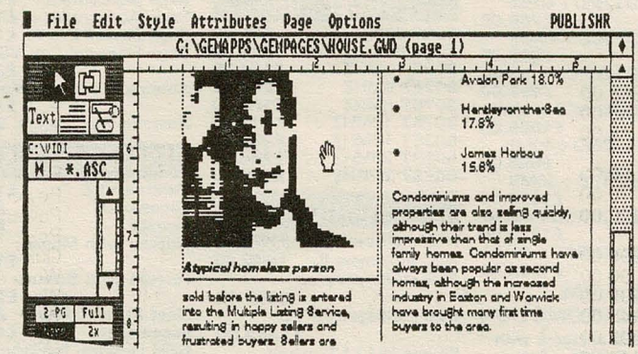
Using GEM DTP



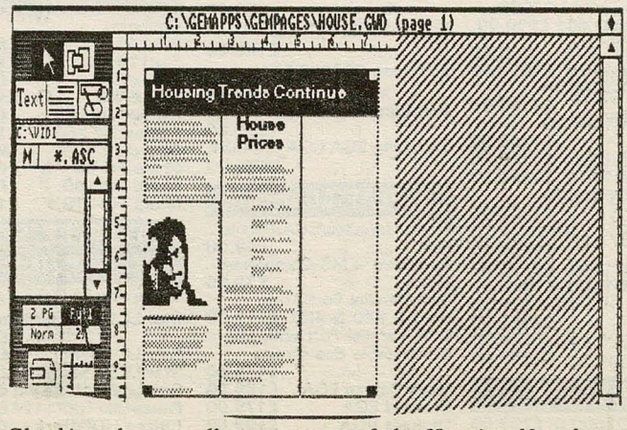
Setting the text rectangle options via the pull-down Attributes menu. GEM DTP calls its non-print frames 'rectangles'



A view of the work area as the page used to print out the girlie pictures was being prepared. The cursor – on the cheek of the girl in the right-hand picture – has been set to 'show position', so its position relative to the origin of the page is shown as x and y co-ordinates. (16,0 and 24,0 here)



Working on the Housing Newsletter...



Checking the overall appearance of the Housing Newsletter by taking a peek at Full Page size

Conclusion

All the facilities needed to produce detailed layouts are present in *GEM DTP*, which is an excellent style sheet driven package. For most of the time, the package is straightforward and easy to use, but there are moments when the approaches to the task taken by *Finesse* and *Timeworks* prove superior. If you are already a fan of Digital Research's other *GEM* applications, then *GEM DTP* could well be the DTP package for you – if only through loyalty. The more price-conscious may find the asking price a little off-putting – unless you are going to take advantage of the colour or large format/portrait options, then *GEM* offers no more, in real terms, that other much cheaper packages.

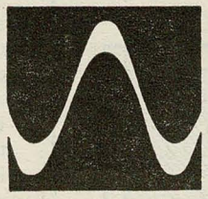
It's competent, clever and perfectly suitable to most tasks, but for ease and speed of use I still prefer *Timeworks*. Whether *Finesse 2* will knock *Timeworks* off my personal Top Slot remains to be seen.

Contact

Digital Research Sales (0635) 353024
Price: £345 plus VAT

Graeme Kidd is the editor of ACE magazine

0753 35557



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ST Talk

by Richard Monteiro

Cameron's Handy Scanner scrutinised, European Trade Show report, new PC and Mac emulators, plus the pick of your letters

THERE'S no denying that the ST lacks decent – make that professional – desktop publishing software. Sure, *Fleet Street Publisher* and *Timeworks DTP* are good enough for producing A4 flyers, but for book and magazine layout they lack oomph. Screen and printed output is shakey and there's a limit to what you can do. I've been lucky enough to get hold of *Calamus* – it's good, better than anything similar on the ST, but not in the same league as Apple Mac DTP software. Believe me, I work in a publishing environment all day and consequently get to use the best DTP software.

Don't get me wrong, the ST is a very capable machine; it's just that nobody has got round to writing top quality stuff for it yet. There may not be any need, either.

Spectre 128 recently dropped onto my desk. Spectre is the Mac emulator which Dave Small (of Gadgets by Small) has been working on for over three years. You might have guessed by now that the product is of US origin; only an American would name his company Gadgets by Small. Dave, incidentally, was responsible for the Magic Sac emulator that died around the same time as Robtek (which, funnily enough, distributed the device in the UK). Magic Sac was far from perfect and worked with dated 64K Mac ROMs.

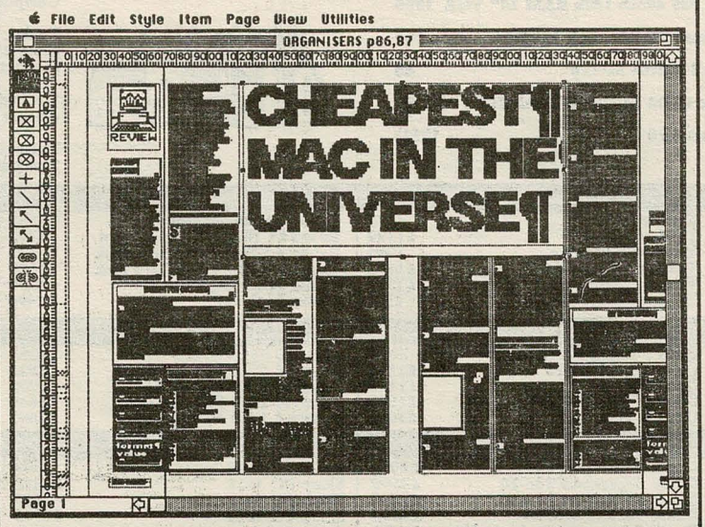
I've had Spectre running for almost a week and I can claim to be overwhelmed by its stability and speed. You get a cartridge containing Mac 128K ROMs which plugs into the ST's cartridge port. Software on disk gets things moving. And boy, do things move! The ST runs Mac programs faster than a Mac Plus runs them. And you've got 31 per cent more screen area to use. It's also more compatible than a Mac II. Spectre really is extraordinary.

Programs tested so far include *Quark Xpress*, *Pagemaker 2*, *Illustrator*, *Microsoft Works*, *Freehand*, *MacDraw*, *MacPaint*, *MacWrite* and *Ready Set Go*. Even games like *Crystal Quest*, *Tetris* and... errm, *MacPlaymate* work without a hitch.

Mac software must be ported to the ST via a wire before it can be used; a hardware fix that will allow the ST to read and write Mac disks is promised for June.

So far, I have been most impressed by Spectre; I'm using it in the office in place of a Mac. Expect an in-depth review and test-of-time report next month. Until then, you can get further details from its UK distributor, HiSoft, at The Old School, Greenfield, Bedford, MK45 5DE (0525) 718181.

Spectre 128



Quark Xpress running on an ST under Spectre 128. You get 30 per cent more screen area than a standard Mac and about 20 per cent more speed than a Mac Plus. Spectre has to be seen in operation to be believed

There's something deeply ironic in the fact that owners of the machine once dubbed the "Jackintosh" – because of its supposed Mac-killing qualities – should be offered a plug-in box aimed at emulating the very machine it should have eliminated. But who cares? Especially if the emulator out-performs the standard Mac machine.

But enough of Mac software. Here's what's been happening in the ST world over the last month.

Hard driving

It must be the time of the year. There certainly can't be any other explanation. Why have so many manufacturers decided to launch hard drives for the ST or lower prices of existing stock? It's good news for you because, ultimately, competition means more affordable prices.

Third Coast Technologies – drive reviewed in issue 14 – was the first to crack the £400 barrier with the introduction of the 22Meg drive. It seems that this is the price many other firms are trying to match or better. For instance, Systems 2000 of Swindon has three new hard drives for the ST: at20 (20Mbytes for £399), at40 (40Mbytes for £499), at70 (70Mbtyes for £899). Details on (0793) 514055.

Back to Third Coast, which has several new mass storage devices on offer. How often do you back up the contents of your hard drive? Speaking from experience, probably never. Until your system goes down you won't do anything about it. FA-ST Tape Backup could be the solution. It's a tape streamer that comes in either a standalone unit or fitted in the same box as one of Third Coast's hard drives. It's compatible with Cumana, Third Coast, SH204, Megafile and Supra ranges of hard drives. A DMA-out for hard drives which lack such a socket is included. It also comes with a battery-backed clock and supports an internal embedded SCSI drive; 155.7 Mbytes can be stored on a single data cassette; average read/write speed is 116.2 Kbytes/second (roughly six Mbytes/minute); TOS, MsDos, Spectre 128 and Magic Sac partitions are possible. The device costs £873 including VAT.

Also coming soon from Third Coast is an as yet unpriced Sony WORM – write once, read many – drive. Software drivers for the ST are in the process of being written. Each WORM disk will be able to store around 300 Mbytes of data.

Finally from Third Coast is a Bernouli drive for around £799. This uses removable 44Mbyte disks which cost £100 each. The Bernouli drive has a 40ms access time which is on a par with fast hard drives. Information from Third Coast at Unit 8, Bradley Hall Trading Estate, Standish, Wigan WN6 0XQ (0257) 426464.

Bristol-based Tempest was aiming for a 20Mbyte drive for under £300. Remarkable indeed! Sadly, that target was missed. Said Gary Drake, Tempest's technical sales manager, "It's surprising how much the individual ingredients necessary for an ST hard drive cost. The £366.85 tag is just the starting price for our 20Mbyte model. Volume sales will bring that down." Tempest's drive is currently the cheapest available for the ST. More from EOS House, 145 Staple Hill Rd, Fishponds, Bristol, BS16 5AG (0272) 574569.

Frontier, meanwhile, has knocked £100 from the price of its popular 30Mbyte Supra drive. This brings the drive down to £499. A spokesman for the company explained the cut: "There are several reasons: market forces, volume sales and better deals from Supra in the States. More people are buying hard drives, which means higher production runs and consequently lower production costs per unit." Contact Frontier at PO Box 113, Harrogate, North Yorkshire HG2 0BE, (0423) 530577, for more on the Supra range of drives.

Show time

The European Computer Trade Show was held from April 16th to 18th at the Business Design Centre in Islington, London. Trade shows aren't generally arenas for picking up new products, so it was a nice surprise to discover several novelties. A number of software companies decided to launch new products or offer upgrades to existing items.

Along with a multitude of hard drives starting at £399, Power Computing announced PC Ditto II. This is a £199 hardware/software PC emulator developed by Avante Garde Systems in the States. According to Power Computing, PC Ditto II's Norton SI rating – the indus-

Continued on page 91

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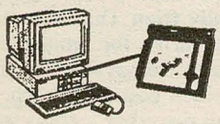

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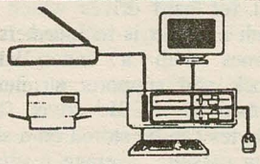

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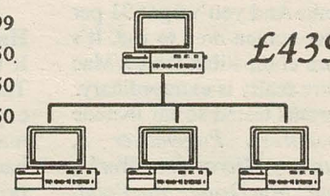

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Continued from page 89

Llamasoft's Grid Runner

try accepted speed rating – is 3, which compares favourably with the IBM PC XT rating of 1, the IBM PS/2 Model 30 of 1.8, and the Zenith EZ-20 of 2.6. All ST models are supported, up to 640K of memory is available (on a 1040 and above), Ditto is installable on a hard disk (with the option of booting direct into PCDos), parallel and serial ports supported, works with the mouse and runs on either an Atari colour or mono monitor. Details from Power Computing on (0234) 273000.

Being a *Protext* fan, I was pleased to hear that Arnor is soon to release *Protext V4.20*. Enhancements promised include a completely revised and reorganised manual, date and time insertion direct into a document, mouse-positionable cursor, better procedure for installing printer drivers, faster CONVERT program, provision for accessing Greek characters, scroll lock and status bar clock. Funnily enough, Arnor reckons the upgrade is very minor. Version 4.30, says Arnor's Mark Tilly, is where major changes will take place. *Protext* version 4.2 retails at £99.95. Upgrading from V3.5x costs £30, upgrading from V3.6x costs £20 and upgrading from V4.1x and V4.0x costs £15. More from Arnor on (0733) 68909.

The upgrade to *Tempus*, *Tempus II*, is finally ready and is being distributed by HiSoft; phone (0525) 718181. *Tempus* is renowned for its speed. *Tempus 2* is said to be faster and includes facilities for editing up to four files simultaneously, three cursor modes, powerful search and replace functions, text conversion utilities, keyboard shortcuts, undoable undo, auto file save and screen-off feature. Price is £39.95. Also new from HiSoft is the £49.95 *C Interpreter*. It's a package designed to take the hard work out of learning to program C. Rather than having to go through the tedium of compiling your program, you can run it in situ. It's ideal for beginners. *C Interpreter* includes a *GEM*-based editor, over 460 library functions, a toolbox, trace mode and link option.

Owing to British Telecom shedding its software arm, Telecomsoft, to Microprose, nothing has been released from the company in over three months. Although nothing has been released from Telecomsoft in that time, game development has continued apace. The result is an impressive back catalogue of games that should hit the shelves soon after Microprose and Telecomsoft sort out the legal side of things. *Rainbow Islands*, the follow-up to *Bubble Bobble*, looks good. The characters are cuter than ever. There's also *Quartz*, which is basically a frantic shoot-em-up. And, of course, *Weird Dreams* and *Verminator*.

The hottest game on the way has got to be *Xenon II* from the Bitmap Brothers. It looks stunning. It's got three-plane parallax scrolling and stacks of fast-moving aliens. The graphics are fantastic. I don't often get excited by games, but this looks set to be a corker. Without a doubt, when it's launched, it will be the best game ever for the ST.

The classics are always the best and, at the £9.95 price that Llamasoft charges for them, there's no complaining. *Super Grid Runner* is the latest of Jeff Minter's early Vic-20 recreations for the ST – as zany and colourful as ever. Details from Llamasoft, 49 Mount Pleasant, Tadley, Hants (07356) 4478.

Quickies

- The ST Club at 9 Sutton Place, 49 Stoney Street, Nottingham, NG1 1LX (0602) 410241 has finished work on the *Fontkit Plus Accessory Pack*. The *Accessory Pack* lets you grab characters or images on screen and convert them to *GEM*-font format. The *Accessory Pack* is available from the ST Club for £4.95 (£3.95 to registered *Fontkit Plus* users). Also from the ST Club is the *Fontpac Series* – a set of fonts on disk. Each disk costs £2.70.
- A collection of fancy borders for graphics and DTP applications is on sale from Electric Distribution; (0480) 496666. *Border Packs* contains 43 patterns in *GEM* Metafile format on ST-format disk for £29.95.
- Soft Bits' *Sprite Master* has been given an overhaul. Version 1.3 rotates objects faster and has improved circle routines. Existing users can upgrade by returning their original disk with a stamp to cover postage. Details on (01) 836 2533.
- Gate Seven Computers of 6A Gwendwr Rd, London W14 9BG, (01) 602 5186, has released an enormous selection of fonts for use with Signa's *Signum 2*. Fonts available include Arabic, Bengali, Farsi, Greek, Gujarati, Hebrew, Hindi, Ladakhi, Marathi, Nepali, Punjabi, Russian, Sanskrit, Tibetan and Urdu; £25 per font if you're interested.
- AMS/Logitech's *Flair Paint* has been taken over by Database Software; (0625) 878888. The price remains the same – £34.95.
- Intelligent Music's £199 *Realtime* sequencer for the ST is now available from MCMXCIX; (01) 724 4104. It can handle 256 tracks and editing is possible in real time. Also available from MCM is *Dr T Orchestrator*, a sound database which allows you to sort through thousands of sounds.
- *K-Scope* and *K-Spect* from Kuma have been updated. *K-Scope* and *K-Spect* consist of hardware and software enabling the Atari ST to be used as an audio frequency oscilloscope and a spectrum analyser respectively. The enhancements mean you can now save data for later display and use. Both products cost £199 excluding VAT. Kuma is at 12 Horseshoe Park, Pangbourne, Berks. Tel (07357) 4335.

File formats

Standard Degas file format explained this month. But before I do that, let me tell you about a couple of very useful public domain utilities. The first is *Deluxe Slideshow* by John Brochu. *Deluxe SlideShow* is an attempt to combine all the currently popular ST graphics formats into one compact, but flexible, slide show program. Formats supported include Neochrome, Degas, Degas compressed and Tiny. Any picture can be loaded and displayed on either a high resolution or colour monitor. The low and medium to high res conversions take a few seconds, but the results are very pleasing since a 16 (or four, for medium res) level dither table is used to represent the different colour intensities.

Full control over slide speed, titling and slide order through the use of an optional script file is possible. You can specify multiple search paths and filenames with full wildcard support.

The second utility, *PicSwitch*, also happens to be by John Brochu. It lets you convert files from one format or resolution to another. Supported formats include Degas, Degas compressed, Neochrome, Tiny, NVision, Amiga IFF low and medium res, *MacPaint*, Mac Startup screen, CIS Vidtex hi-res RLE, Atari graphics 8 screen dump, Atari graphics 9 screen dump, Atari *Koala/ Microlllustrator* and Atari *MicroPainter*.

Both utilities should be available from any good PD library like ST UK, (0279) 757692,

Continued on page 94

Multilingual fonts

Arabic

«لجان صدام» شكلوا السريين الانتفاضة زعماء ن ،

Bengali

টাওয়ার হ্যামলেটস্ কাউন্সিলের এই সিদ্ধান্তের ফলে

Devanagari (Sanskrit, Hindi, Marathi, Nepali)

हर वर्ष नये नियम, अधिक कठिन तरीके और वह परिवर्त

Farsi (also Urdu)

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Greek

Κάποτε ἀναρωτιέμαι ἄν εἶναι αὐτὸ ἐνοοῦσε ὁ Κρίσνα --

Gujarati

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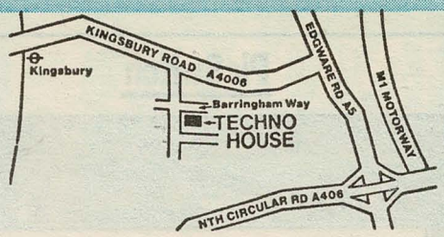

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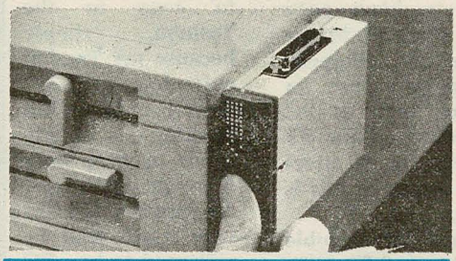

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Auto Self Test, READY and BUSY indicators

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Both parallel and serial sharers fitted with 25 way D Connectors

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Add £30 for units with 64K buffers
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(All lines are switched).	Parallel	Serial
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3 computers to one printer	£39(c)	£39(c)
4 computers to one printer	£45(c)	£45(c)
2 computers to 1 or 2 printers	£49(c)	£49(c)

Cable sets for above sharers available for all popular computers

Detailed Catalogue on Printer Sharers available

Continued from page 91

Goodman, (0782) 335650, FloppyShop, (024) 691824 or Softville, (0705) 266509.

The normal Degas file format is probably the simplest available. There is also Degas compressed – don't worry about that this month. Normal Degas files can be distinguished by their PI? extension. The third character in the extension will be 1, 2 or 3, depending on the file's screen resolution. A high resolution file would have the extension PI3.

Degas file size is 32034 bytes. Contained in the 34 byte header is information regarding resolution and colours.

Byte	00 01
Value	00 00

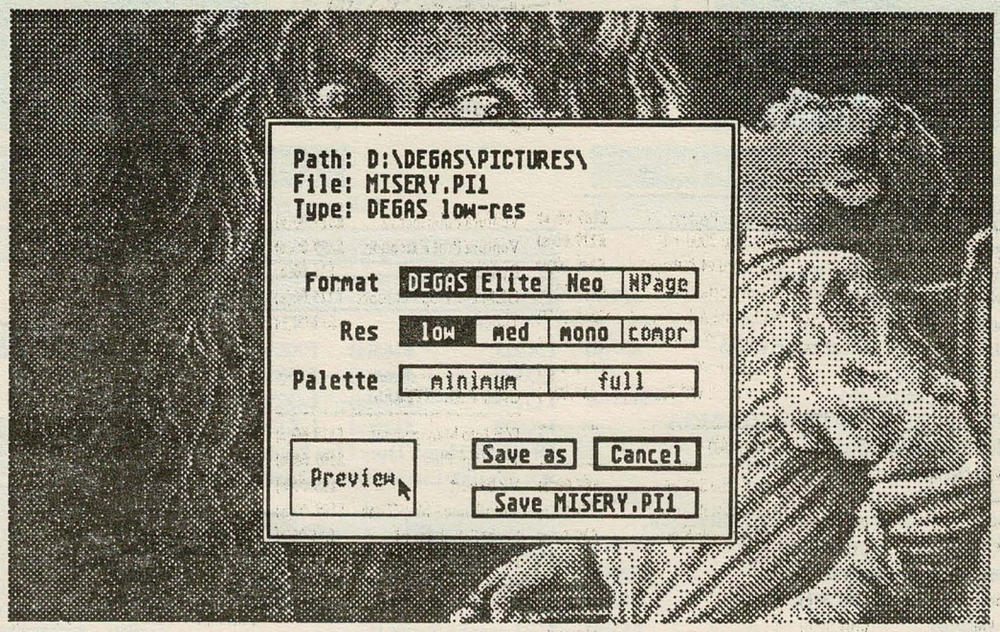
The first byte is null; the second will either be 0, 1 or 2. Zero for low resolution, one for medium resolution and two for high resolution.

Byte	02 03... 32 33
Value	04 32... 01 67

The next 32 bytes determine the colours in ink pots 0 to 15. Two bytes contain the colour information of one ink pot. So – taking the first two of the 32 colour bytes as an example – 04 23 indicates a red value of 4, a green value of 3 and a blue value of 2. The first hex digit can be discarded. This is the same layout as used in the Neochrome file format detailed last month, and is compatible with the XBIOS set-palette routine.

All 32,000 remaining bytes make up the screen.

PicSwitch



PicSwitch hard at work. The latest version makes it possible to convert 16-colour images into high resolution black and white. By using sophisticated dithering techniques, John Brochu's utility makes pictures like the one above possible

Letters

Your news, views, hints, tips, moans, groans and problems aired. This is the place to send them, so get writing. The address is ST Talk, *Computer Shopper*, Dennis Publishing, 14 Rathbone Place, London W1P 1DE. The best letter each month wins a mystery prize. It could be anything from a disk packed with PD programs to the latest software release. What are you waiting for?

■ Calling Steve Ridd

Err, Steve... I've lost your letter. So if you want a copy of *Larry Goes Looking For Love* for that tip on *Air Warrior*, you'd better drop me a line, quick. Sorry about that...

■ True blue

As promised, the second half of John Day's solution to *Emmanuelle*.

Once you've had your night of fun you should have enough eroticism to find Emmanuelle. Bet you forgot about her, didn't you? If your eroticism is over 75, go to the hotel and try to find the barman. Ask the barman, when you find him, about Emmanuelle's next destination. Repeat the procedure if the barman claims not to know. Eventually you'll get the information you require. That done, go to the airport and you'll meet Emmanuelle.

If you're wondering about using the third statue, try chatting up the strumpet (*Eh? What have trumpets got to do with it? Ed*) at the reception in Salvador. If you're successful, she might tell you the room number of a bloke you need to see. If she doesn't (which is 99.9 per cent of the time), don't jump in bed with her as it uses vital eroticism and energy. Go to the appropriate room, if you get the number, and a person will give you some tips and a mask. With that mask you will be able to go to the carnival at the top of town where you chat up the girl in the foreground

■ I think, therefore ST

Phil South's problem page reply to Bill Lockley in the March issue of Shopper seemed to suggest that an IBM emulator such as PC Ditto was needed on the ST for text transfer to be effective. In my experience this is not necessary.

I have had no trouble swapping data on 3.5" disks between my 1040 ST and Toshiba 3100e. After reading Phil South's reply I double checked by formatting one disk on the ST and another on the Toshiba (as 720K rather than 1.4Mbytes, of course). Each disk was then subjected to read/write tests on the other machine and back again to the native machine. As I thought, there was no problem. A problem will only arise if Bill Lockley has a single sided ST drive since this confuses the Toshiba (or in Bill's case the PS/2) no end.

I use a Tandon PAC Plus in the office and have no problem in copying C source code to and from my home ST using the Toshiba as an intermediary. (I have to use the somewhat tortuous route of Brooklyn Bridge to copy to the Toshiba, simply because my Tandon only has a 5.25" drive.) If Bill Lockley simply needs to swap data between IBM and ST formats, I doubt very much that he will need to buy PC Ditto.

M Morgan,
Southfields, London

You are quite right in saying that it is possible for the ST to read and write PC formatted disks – however, I'm not convinced about PCs reading and writing ST format disks. There also seems to be a limit to the size of a PC file that the ST can read – 64K. Directory information is store d in a slightly different manner on both disk formats. The ST can cope with the PC's method of doing things, but the PC is more fussy. At least, that's what I've found. And, if Atari is to be believed, what Atari also think to be true. TOS version 1.4 is purported to format disks in a way that is more compatible with the PC's way of thinking. When that arrives, it shouldn't matter whether the disk was formatted on an ST or a PC.

For your help you get the PC version of Saboteur II. I've had it lying around for ages and, since I don't own a PC, I'm sure you can put it to better use.

Saboteur II: You are the Ninja's beautiful sister, avenging her dead brother...

Continued on page 96

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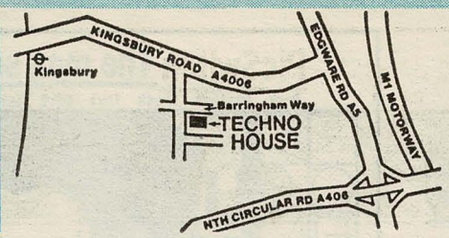

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Please ask for details.

Meta i

Assembler & Eprom Assembler	£995(a)

Continued from page 94

with the mask. By b*nking her you'll have achieved all three things.

A few useful tips: the woman at the reception area in Rio gives you an energy restorer and keeps coming back if you don't... you know what. If, at the hotel reception, you ask the man if Emmanuelle is staying at the hotel and he gives a room number, visit it for the best... errrr, worst scene in the game. Lastly, don't b*nk unless you have to!
John Day,
Hitchin, Herts

■ **Speling cheker**
I was reading your article in Shopper the other day and wondered if you, or any other ST users, know about any good spelling checkers. I already own *Spell It*, but it will only tell that a word is spelt incorrectly. What I need is a spelling checker that will not only tell me if a word is spelt wrongly, but will also provide me with possible alternatives and let me substitute one of the words for the incorrectly spelt one.
David Pullin,
Standish, Wigan

Unfortunately, I don't know of any standalone spelling checkers for the ST. The only ones I'm aware of are married to word processors. Perhaps someone else knows differently? Arnor's Protext comes with a 70,000-word dictionary and lets you do everything you want; you can contact Arnor on (0733) 68909. First Word Plus also comes with a very competent spelling checker. In fact, most word processors come with a spelling checker of some sort. It's a good idea to get a spelling checker/word processor combination as spell checking can take place in situ.

■ **Scan and deliver**
I have the *Master Scan* and *Master Paint* packages for the PCW8512 and was wondering if the scanned images could be transferred over to an ST for use in *First Word Plus*. As I already own a scanner for the PCW, I really don't want to have to shell out for one for the ST. Any ideas?
Paul Smith
Shirecliffe, Sheffield

Sorry, Paul, but I haven't a clue. It should be easy enough to transfer scanned images across to the ST; something like the public domain communications package Red Ryder will do the trick. What you do with the file once you've got it across is another matter. I don't know what format Master Scan saves images in – but I bet it isn't GEM IMG. Can anyone help?

Review

Cameron Handy Scanner
From £229.88

YOU MIGHT well have been led to believe that scanners exist only for the PC after reading the article on the subject by Messers James and Williams in the April issue. There are plenty of flatbed and hand held scanners for the ST. One such hand held model is the Cameron Handy Scanner, currently being distributed by SDL.

Scanning is a reasonably cheap and easy method of getting artwork into a machine. It's a lot less hit-and-miss than a video camera, subject and video digitiser. The uses for scanned artwork are many, including DTP, word processing and paint packages.

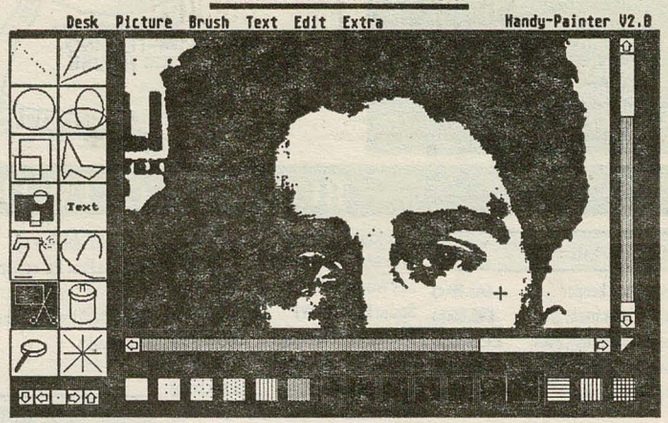
An interface sits in the ST's cartridge port and has power supplied to it via a 15 Volt power pack. The palm-sized scanner comes with a two metre length of wire that tails into the interface.

The scanner works by emitting light from a row of LEDs on its underside onto the image under scrutiny. The light is reflected back from the image and focused through a lens onto light-sensitive cells. The strength of the returned light signals are then translated, in the case of the type 4 scanner, into 16 shades of grey for the computer to deal with. A roller underneath the scanner, in contact with the surface being scanned, rotates as the unit is moved. The processor within the scanner counts the number of rotations and works out how many pixels have been scanned.

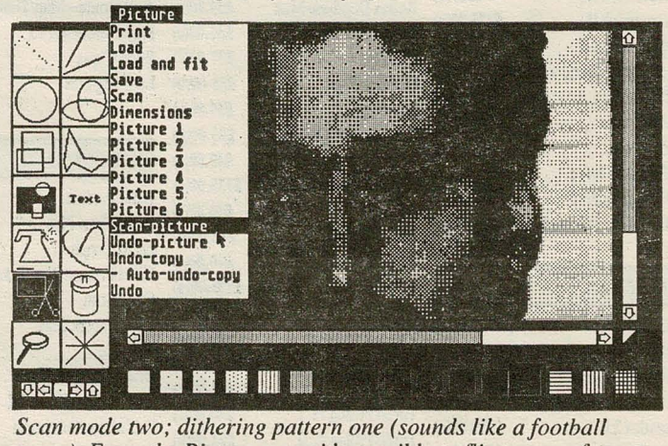
Before you can get down to any serious scanning, it is necessary to install the software. The scanner is sold in various countries and, consequently, drivers for the various languages are present on disk. Of course, you don't have to bother with this, but it's advisable if you want menus and messages in English.

A program called PAINTER.PRG lets you scan and perform simple graphics functions on the grabbed image. The first thing you'll want to do is scan a picture – the software only works in high resolution so the default number of lines to scan is 400 (remember the ST screen size is 640 by 400). The number of lines can be increased to as many as memory will allow. The type 4 scanner reviewed can scan to 200, 300 or 400 dots per inch resolution. The scan area is roughly 2.5 inches, which translates to 500 pixels (about eight inches) on screen, assuming you're scanning at 200dpi; that's three times larger than life. Because the scan area is small, it is possible to scan in strips and

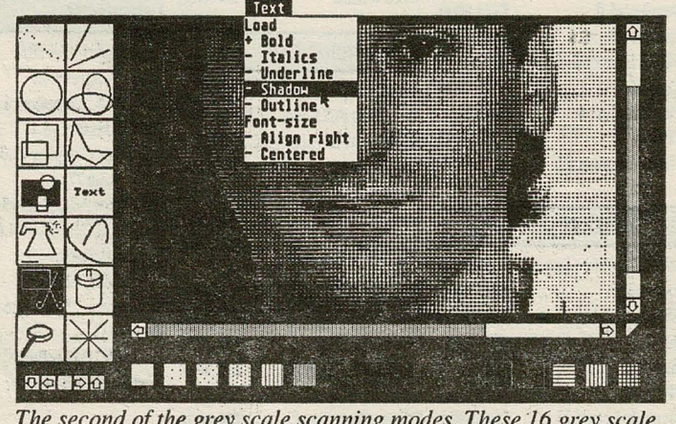
The man scanned



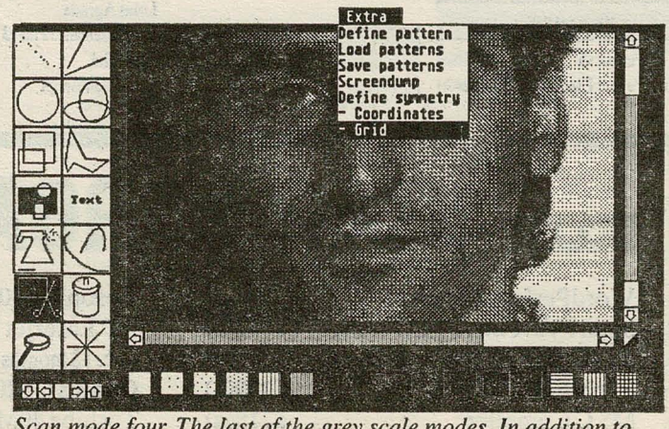
The type 4 Handy Scanner has four scanning modes. The first is a black and white mode (shown here); the other three offer different grey scale scans. The scan mode shown here is good for cartoons, line drawing or lifting text from a page



Scan mode two; dithering pattern one (sounds like a football score). From the Picture menu it's possible to flip to any of seven graphics buffers, set the size of buffers and scan

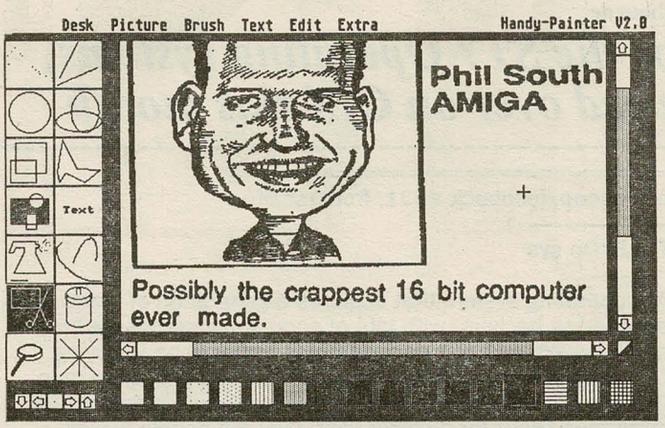


The second of the grey scale scanning modes. These 16 grey scale modes are better for photos – the one you use depends on the photo and your taste



Scan mode four. The last of the grey scale modes. In addition to selecting the scan mode, you can alter the contrast. The software allows you to produce negatives from scanned photos and flip the results in any direction

Shopper slander shocker!



Monteiro's bid for this month's MacBiter Shopper Columnists' Solidarity Award. Any more of this, chaps, and we'll just have to bang your heads together

join the bits together. This isn't as impossible as it sounds because the software provides ample tools.

There are seven buffers, or painting screens, that can be any size, memory permitting. A set of cut and paste functions lets you copy data between buffers. So, if you wished to scan a 5" by 4" photo, you would need 1,000 pixels by 800 pixels at 200 dpi. You'd have to set up one buffer to be slightly larger than this – say, 1,100 by 900. Scan the first portion and copy this into the large buffer. Make another scan just overlapping the first and copy it to another part of the buffer. By using a magnified screen it shouldn't be hard to find corresponding points in the scans. There isn't a preview command to show the complete image as it is being assembled, so you're working blind.

Facilities are included for drawing lines, rays, circles, ellipsographs, rectangles and polygons. Pattern filling, adding text, and spraying is also possible.

Scanned images are saved with a PIC extension – these are specific to *Handy Painter* and store images larger than screen size. It would have been smarter if images could be saved in IMG format. As it stands, though, it is necessary to use a utility (provided) that permits you to convert PIC files to Degas format. Hardly very useful, as you only get the top right of the scan.

The manual isn't wonderful, being translated from German. Still, operation of the unit is straightforward enough. With a little work the results can be very good. The handy scanner is also a cheap alternative to the video camera and video digitiser set up.

Models and prices

Three of Cameron's ST scanners are available from SDL:

Type 2: 200 dpi resolution in two shades (black and white), priced £229.88.

Type 4: 200, 300 and 400 scan modes in 16 grey scales, at £344.88.

A4 Flatbed: £678.50.

Contact

SDL,
1-4 The Mews,
Hatherley Road,
Sidcup,
Kent DA14 4DX
(01) 309 1111

Richard Monteiro is editor of ST Amiga Format magazine. He is an enthusiastic keeper of tortoises (meat eating variety), Asterix the Gaul fan and eater of fig tortillas

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Shopper online

by Huw Collingbourne

Which is more reliable – the Mac or the ST? Operating systems, disk drives and BIOS are also chewed over on CIX this month

MODEMS have strange effects on people. I see it all the time on CIX. People I know to be quiet, sensible and level-headed individuals suddenly change into opinionated, raving idiots.

Fortunately, the greatest excesses take place in dark, dim recesses of the bulletin board, far away from the enlightened regions of the *Shopper* conference. Even so, it has been known for some participants in our conference to be less than cautious about what they say or how they say it. So, before printing any messages in these hallowed pages, we scour them for hints of libel, defamation of character or blasphemy against any of those major religions which are likely to strike back!

In spite of all this spineless caution, the messages which we print aren't usually edited at all apart from correcting spelling mistakes and occasionally cutting down the 'War and Peace'-sized contributions to something more manageable.

I'm pleased to say that nobody has ever complained on the grounds of unreasonable 'censorship'. On the other hand, I have received a few complaints that messages aren't censored enough!

Occasionally, somebody feels that they have been grossly slandered by another participant. Then again, it sometimes happens that a person who wrote some strongly-worded message gets cold feet by the time they see that message in print. I have been called names several degrees worse than 'shameless bounder' simply for reproducing such messages verbatim.

Of course, the best way of having your own say, correcting any misapprehensions and striking a blow for Truth, Justice and the *Computer Shopper* Way is to get onto CIX and tell us exactly what you think.

If you haven't already joined us online, just connect up your modem and get dialling. The *Computer Shopper* conference is to be found on the Compulink Information eXchange (CIX). The number to dial is (01) 399 5252. If it's your first time, you must enter the word 'new' when asked for a nickname. The one-time registration fee is £12 and is paid by quoting a credit card number when you are online. Connect charges are £1.20 per hour off peak and £2.20 per hour peak. Monthly minimum is £5.00, billed in advance.

At present there are five topics in the *Shopper* conference: 'feedback' – spout off here about anything; 'modula2' – for all who love or loathe this language; 'qa' – our 'problem pages'; 'gossip' – trivia, trash and tittle-tattle; 'listings' – downloadable programs and source code.

This month's selection from our conference demonstrates the sheer range of the subjects being discussed. There's everything from opinion to practical advice.

How do you turn your NumLocks off without even touching them? What's the best way to take control of your Basic Inputs and Outputs? Where have all the operating systems gone? And should we have sympathy for all those men with Macs, dirty or otherwise?

If you've got technical queries, useful hints, opinions or complaints, you know the place to get in touch.

(Huw Collingbourne, CIX ID 'compshop' – conference Agony Aunt).

OPERATING SYSTEMS

(Re. Speaker's Corner (issue 14) in which Gary Kildall, author of CP/M and chairman of Digital Research, discussed the CP/M, MsDos and Concurrent Dos operating systems).

==========

compshop/feedback #919, from dj

DR has pushed the dead horse around under the guise of Conc-Cpm and others, and just as the 386 machines arrived, it looked like it was staggering to its feet. Yes, there is a market for a multi-user MsDos, mainly with people who desperately won't give up Dos for reasons stupid/unknown. Microsoft doesn't have a multi-user product...

==========

compshop/feedback #931, from rscaife

TITLE: Op sys

Any operating system that acquires a generation of users (as opposed to hackers) with lots of good software will die hard and long. What I can't understand is why anyone is buying OS/2. UNIX is now offering a good front end and more than OS/2 in less disk and RAM space. Desqview will do actually more than OS/2 for a single user. Why are people buying OS/2?

==========

compshop/feedback #932, from cassidys

Because their corporate purchasing morons tell them to.

==========

compshop/feedback #933, from jack

The surveys would seem to show that people are not buying OS/2 in general, and most of those who have bought it were looking to be better informed and prepared for the future, rather than buying it to use. The surveys also show that most people don't expect OS/2 to get more than a small proportion of the market in the 90s or, in some cases, ever.
Rgds, Jack

MACS

(Seems dear old John Molloy riled Guardian computer person Jack Schofield in issue 14, when he complained that whenever a Mac is mentioned in Jack's column, "he always adds the rider that Atari will be able to do it (quicker, cheaper, faster, later) on the ST." Molloy went on to express some doubts about Jack's faith in Atari. Jack managed to get over his natural reticence to say a few words in his own defence...)

==========

compshop/feedback #942, from jack

TITLE: Bigoted rubbish
No doubt the section on "let's all write silly things about rival machines" gave us all a good laugh, but since my name was taken in vain I thought I'd contribute 2p-worth back. First, *everyone* thinks Macs are overpriced in the UK, not just me, and I don't apologise for spreading the information. Second, the Atari ST makes a good comparison since there are three Mac-emulators for it. When you can actually run Mac software on an ST, and it runs faster, and on a bigger screen, it seems valid to ask why a Mac Plus costs more than three times as much. I'm not saying the ST is better, because it isn't. But the price premium is a bit much to pay for Mac ROMs when Apple has already sold billions of quid's-worth of the machines. Third, reliability. Of the three Macs I have known well over a long period, two have been extremely flaky and one (with a scanner and big screen) has become frankly unusable. Of the two STs I have used (though for much less demanding work) both have performed perfectly and without any hardware faults at all. It would be foolish to generalise from such limited experience, and I wouldn't do it. But it is the sort of thing your contributor ought to ponder.
Rgds, Jack

==========

compshop/feedback #943, from cassidys

Continued on page 100

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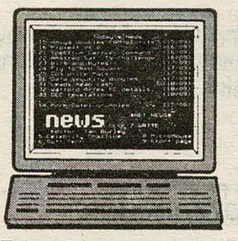

INFORMATION

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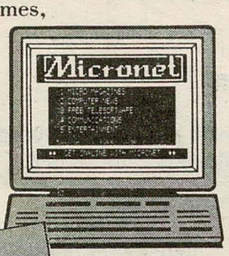

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Continued from page 98

A) Everyone agrees that Jack has a minor and inconsequential bias.
B) Jack is right about Mac pricing levels.
C) Just because he says it doesn't transform it into the result of his bias. A truth stands on its own.

==========
compshop/feedback #944, from jsan
---

jack –

I must admit I agree with most of what you say... however, I don't agree that STs are more reliable than Macs. We have 3 or 4 Macs at work, and probably about the same number of STs (maybe more STs)... but we get through STs at quite a high rate... they go wrong a lot... especially relating to disk drives or RAM... whereas our Macs have never gone wrong.

I definitely agree that Macs are overpriced in England, and probably in the world anyway... but in America prices tend to be 30 to 50% lower for Mac products than here. It's very cost effective to grey import a Mac SE or Mac II from the USA as the power supplies work all over the world without extra transformers necessary.

A Mac could easily sell for closer to what STs sell for, I agree! But it's pretty obvious the extra money Apple charge for the Mac is what keeps them in profit... and as has been seen recently, Atari have trouble keeping in profit (their recent accounts showed a HUGE loss). If Atari had more margin on their STs maybe they would be in better profit..?

– Jez.

==========
compshop/feedback #945, from hisoft

I quite agree – Apple must have very nice margins compared to Atari's. Our 1p of sample on the reliability front: STs & Macs are as reliable as each other.

Dave Nutkins, HiSoft.

==========
compshop/feedback #946, from paulo

Dave,

Sure that shouldn't be 'un'reliable as each other ?? :-)

==========
compshop/feedback #955, from jack

I didn't say STs were more reliable than Macs. I simply said the STs I have used have proved a lot more reliable than the Macs. I was simply pointing out that it is of limited usefulness to make sweeping generalisations from very limited data.

Rgds, Jack

==========
compshop/feedback #958, from cassidys

Someone somewhere should instigate a user-reported reliability survey on Micros. Info is collected for minis and so forth, and banded about by IBM sales reps. What about some reliability stats here?

==========
compshop/feedback #962, from rscaife

That has my full support. When I am buying machines for the office I am much more interested in how reliable they are than whether they have the latest twiddle which we shall probably never notice in use!
Reg

==========
compshop/feedback #961, from jack

There aren't enough of us, and we aren't reliable! Anyway, it's much easier to ask the people from the repair centres and/or dealers, who are currently moaning about high failure rate on the C64 (up to 50 per cent in some cases). However, failure rates on micros tend not to stay constant, due to board changes and equipment variations (anyone care to guess how many different makes of drive have gone into various STs?).
Rgds, Jack

==========
compshop/feedback #959, from kew

Micros crash all the time if you are writing software, or if you are new to the system. Also, you can never tell if the problem is with the application or Dos or the BIOS or the hardware.

Most bigger computers are robust enough to tell you what has gone wrong.

Bryan.

==========
compshop/feedback #960, from niels
(Niels Jensen - MD JPI)

Or you could try using OS/2. Contrary to popular belief OS/2 is not junk and you won't need to reach for that Big Orange Switch whenever you have been naughty.

DISK DRIVES

==========
compshop/feedback #974, from sjones

TITLE: Chinon F-354 3.5in drives.

ST Talk – letters – April p156. A customer of mine bought a 3.5in drive from a certain supplier in Evesham. After accidentally disastering 2 floppies, he realised that it wasn't recognising that the floppy had been changed. (Writing to floppy 2 using the FAT from floppy 1 is not clever!) On complaining to the supplier, he was told that the drive was perfectly OK. I was passing them, so I took it in for him. 2 weeks later, it came back with a damn snotty letter saying they'd tested it and found it perfectly OK. (Incidentally, he has an AT compat, using the WD1003 controller). Now, he has to be careful to force his system to do another dir by changing drive assignations after swapping disks.

Please, do you have any hard copy you can let me have to back up your assertions re the Chinon drive?

Also, when you say 'raise pin x of ICx', do you mean unsolder (or unplug) the IC and bend the leg up? Taking it back to the dealer didn't exactly help!

Simon *–*.

==========
compshop/feedback #977, from hills

Try doing ctrl-c when you change disks. Its easier than swapping drives when your disk change line is up the Swanney.
SJH.

==========
compshop/feedback #978, from davenewman

I had the same problem with a Chinon drive on my AT compatible. My drive does not have changelock support, so the AT does not know when I change disks. I got round the problem by using DRIVPARM in my config.sys file, to tell Dos that the drive is a 720K drive without changelock support. IBMDos 3.3 does not support DRIVPARM, by the way, so I'm stuck with

Tandon MsDos 3.2.

Some Chinon drives can be set up for changelock support. Find out the complete model number, and either ask here, or join the IBM PC Users Group and telephone their engineer, Derek. They have amassed technical details on every drive under the sun.

Many dealers do not know this, as they test the drives either in PC compatibles or on systems set up using DRIVPARM. Does yours know the difference between an AT and a PC?

==========
compshop/feedback #979, from hex

There's a patch for Dos 3.3 to make it support w3DRIVPARM. In CONFIG.SYS, put:

DRIVPARM = zzz/A:...

where z is a Ctrl-A. That is, put 3 Ctrl-A's immediately before the driveparm parameters.

R

BIOS

==========
compshop/qa #219, from compshop

TITLE: BIOS and ShiftKeys
My PC has the annoying habit of booting with NumLock turned on when I'd prefer it off. I've tracked down a way of reading keyboard shift-key status using various BIOS routines but I'm not sure of the best way of altering shift status. What I'd like to do is to write a small prog that will turn off NumLock whenever I boot. Any code fragments would be gratefully received. Huw

==========
compshop/qa #221, from pjackson

If you use KEYBUK, just put a /N switch after it – turns off numlock. Is there something similar in 3.3?

==========
compshop/qa #223, from mpack

You could try this wee Modula-2 proggy...

```
MODULE FiddleNumLock;

CONST NumLockFlag = 5;

VAR KbdFlags[0:417H]:BITSET;

BEGIN
    EXCL(KbdFlags,NumLockFlag);
END FiddleNumLock.
```

– Don Milne.

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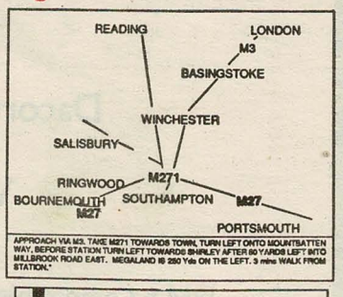

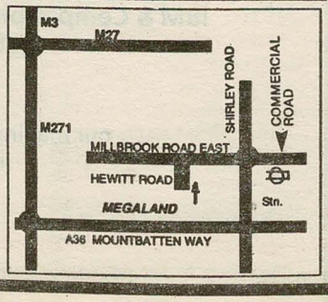

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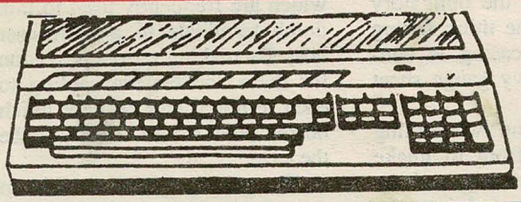

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Reaching for the sky

by David Robinson

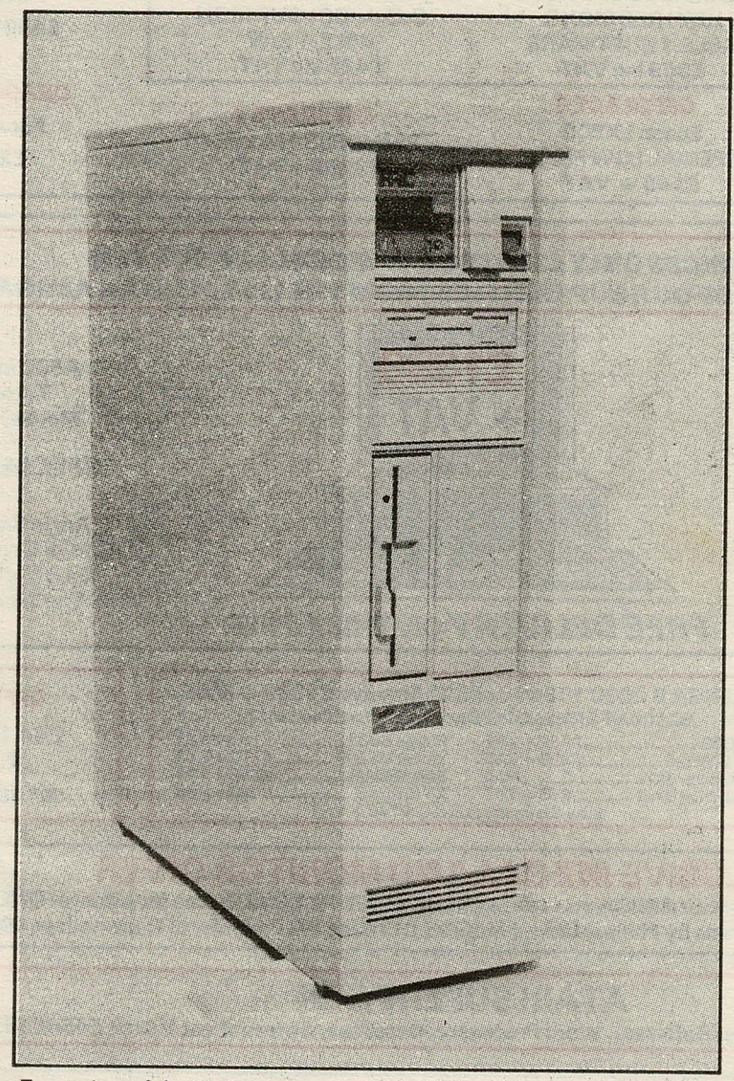
David Robinson sets his sights high and puts the American Research Corporation's SkyScraper 386 to test

IT WAS love at first sight. Not me you understand, but Denise, my wife and business partner. And what was the object of her desire? The ARC 386 SkyScraper which I'd just removed from the enormous packaging that they ship these things in.

We were in the process of replacing one or two of the machines on our network and Denise's old computer (an ARC model 8 XT clone) had been sold to a friend who wanted it right away. Her new computer was not due to arrive for another week so she immediately laid claim to the 386 as a temporary replacement.

Her attitude to computer hardware is strictly utilitarian – what can it do to make life easier – which, I guess, is why it was love at first sight (or more correctly, love at first compilation). She had been modifying an accounting system written in *TAS* and recompiling some of the programs was taking quite a while on the old XT. The blinding speed with which the ARC gets through work was sheer luxury.

OK I know what you're going to say – her reaction would be the same to any half decent 386 machine – so what's different about this particular one?



Front view of the SkyScraper

Components and construction

As the name implies, the American Research Corporation 386 SkyScraper is a tower configuration computer with an Intel 80386 CPU running at 20MHz. There is a slightly cheaper 16MHz version of this same computer which has been available for a while.

Computer manufacturers have to be careful about the use of the word 'tower' as NCR (who ?) is currently claiming that this generic word is a trademark to which it controls the worldwide rights. Anyone offending by calling their upended machine a 'tower' is likely to be served with a writ, hence the rather more cumbersome 'SkyScraper' name adopted by ARC.

Many people think that the tower configuration is nothing more than an old desktop case stood on its side. However, I find that access to the innards is much easier with a well-designed tower casing.

To gain access to the insides you pull off the front facia panel, which is purely for decoration, remove two screws and the top panel lifts off. You can then slide off the whole left side panel which gives you free access to the internal components.

With the exception of the decorative facia, and the obligatory feet which stop the thing falling over, all of the casing is constructed from heavy gauge sheet steel.

Inside you'll find two cooling fans, one at the front to intake cool air into the casing, and the usual one incorporated into the large 280 watt power supply. There's not much danger of overheating here, even if you fill the wide open spaces with extra boards and drives.

You would think that two fans would make the SkyScraper incredibly noisy but that's not the case. It's actually quieter than many desktop machines I've come across.

It is clear that the SkyScraper was designed to be used as a multi-user machine. Set into the rear case panel are eight socket places for the outputs of one of the special multiple I/O boards which are frequently used to link dumb terminals to a multi-user host. By making proper provision for these sockets the cabling to each terminal can be kept much neater than would otherwise be the case.

The principal hard disk sits in a cradle at the top of the casing which can hold either two half-height or one full-height disk drive. The standard hard disk is a 40 Mb Miniscribe with 28 millisecond average access time. There are also 3.5" and 5.25" drives fitted as standard. These are both dual capacity devices, capable of reading/writing 1.44 Mb/720K and 1.2 Mb/360K respectively.

There are spare spaces for one 3.5" device and one 5.25" half-height device, which could be used to house a tape streamer.

If you want a hard disk larger than 40 Mb then ARC will fit any specific disk to your order. These days anything up to 700 Mb can be had in a single drive and would fit into the full height space in the top cradle.

Available for a mere £50 extra is the Western Digital 1006 hard disk controller which will support a one to one sector interleave on the hard disk. If you want fast hard disk access times then this is a very desirable feature.

Two megabytes of 80 nanosecond memory is fitted as standard together with 64K of fast memory cache, allowing zero wait state operation. The 1408K of memory above the Dos maximum of 640K is available as extended memory so is not usable directly by applications. This is not such a drawback as you might at first think as this kind of computer is frequently used as either a file server or the basis of a multi-user computer system. When used this way you can set up the extended memory as a cache for the hard disk, significantly enhancing the speed of disk intensive operations.

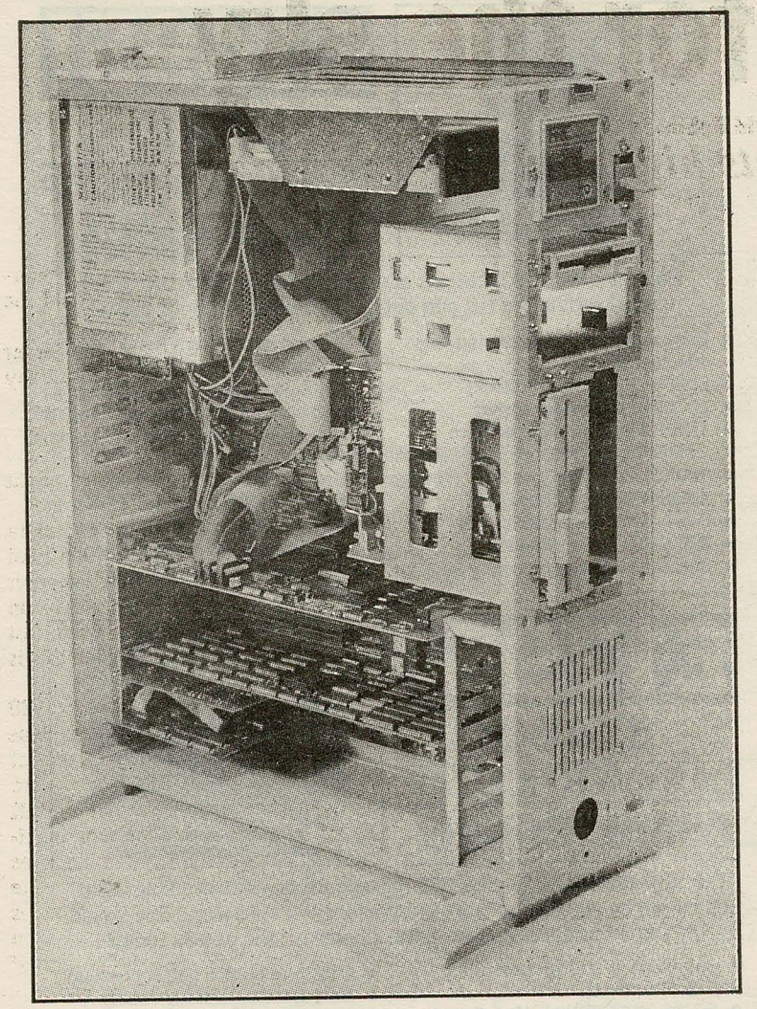
The DNA network which we use allows you to configure both expanded and extended memory as a network disk cache so the 1408K above Dos is all put to good use for the benefit of everyone on the network not just the person working on the server.

The motherboard is ARC's own manufacture with eight slots – two 8 bit, four 16 bit and two 32 bit. A multiple input/output card has two RS232 serial ports (one 9-pin and one 25-pin) and one parallel printer port.

VGA (Video Graphics Array) is standard providing a 16 colour display at 640 by 480, pixel resolution if you also have a suitable monitor to display the image. The standard monitor is a paper white monchrome screen which operates at EGA resolution of 640 by 350 pixels.

Although this monitor has ARC badges it is actually manufactured by Philips which has a reputation for quality. You can reverse the display colours at the press of a button on the front panel allowing you to choose between black on white or white on black. The EGA alternative is also a Philips monitor.

HARDWARE REVIEW: ARC SKYSCRAPER



Inside the SkyScraper. Not just a desktop turned on its side

Also standard equipment is the 102 key keyboard. The feel of this is medium to firm but, in my experience, the keyboard most people like is the one they have been using for the last week and, therefore, the question of 'feel' is very subjective and not worthy of long discussion.

System software

MsDos 3.3 is the standard operating system provided with all ARC machines. This comes complete with a full Dos manual explaining all the Dos internal commands with additional sections covering the utilities *DEBUG* and (the still dreadful) *EDLIN*.

It beats me why, after all the revisions and additions to Dos, Microsoft and its many licencees have never seen fit to provide someting better in the way of a text editor than *EDLIN*. Only Amstrad, by providing *RPED*, has managed to see sense in this respect.

Bundled with every SkyScraper machine is a Genius brand mouse and a useful collection of utility software. In addition to a Microsoft-compatible mouse driver there is *Dr Halo*, a proficient graphics and slideshow creation program and Genius Menu which provides PopUp menus for many popular applications including *Lotus 1-2-3*, *dBase III*, *Paradox* and so on.

The 386 SkyScraper is an ideal vehicle for running Digital Research's popular multi-user operating system Concurrent Dos, which comes in several forms. (C-Dos , C-Dos XM and C-Dos 386).

Digital Research obviously holds the machine in high regard as a Concurrent Dos host as it has purchased four of them to use as demonstration machines in its UK offices.

UNIX is also available as an alternative operating system at additional cost.

Compatibilty

Once my wife's new computer arrived she reluctantly (VERY reluctantly) parted company with the ARC 386 and it was put to work in its proper role as the server in our network.

For the last few months we have been running the DNA network supplied by Equinet Computers. The ARC SkyScraper and DNA get along very nicely indeed thank you, servicing five workstations of mixed pedigree. There are two 10 MHz 8088 machines, an Amstrad 1640 with an EGA screen and its own hard disk, an old Televideo luggable computer (the very first PC compatible we owned) and an AT clone.

This collection of machines runs a very mixed bag of applications including:

- *Paradox* databases
- Spreadsheets using *VP Planner Plus*
- *Turbo Pascal* and *Turbo C* applications development
- *DataBoss* 4GL applications
- DTP
- Word processing using *MutiWriter* and *Word Perfect 5*

So far the question of compatibility is easy to discuss – we haven't found any software which doesn't run properly.

Pushing our luck we then replaced the standard screen driven by the VGA card with one of the new Samsung A4 high resolution screens. This comes with a special video board and installation routine.

You can install the Samsung either as screen one or as a second screen with a Hercules-type mono screen as the main one. The ARC mono screen (along with most other clone 386 screens) isn't really a Hercules mono type screen at all, but a monochrome version of EGA.

Try as we might we couldn't get the two screens to work together so, in the end, we settled for removing the VGA board leaving the Samsung video board as the main one.

The ARC now runs *WordPerfect 5* and *Ventura* in magnificent A4-sized pages, while other applications, not knowing how to display 66 lines per page, revert to the normal 25-line monochrome mode.

Although we couldn't get the two monitors working side by side I suspect that this was due to the presence of the VGA card. If this had been an ordinary monochrome card I suspect that the twin monitor set up would have worked as documented.

Benchmarks

Having lost my disk with all the standard hardware benchmarks, I thought it would be useful to run some comparisons between machines running some real applications. Rather than make up some artificial tests I chose to use a couple of real jobs as the basis for comparison.

The machines which I used to compare the ARC against were an Amstrad 1640 with a 40 Mb hard disk and an IBM 8MHz AT also with 20 Mb hard disk. The hard disk in the Amstrad is not an original fitting but a Miniscribe disk with an RLL controller. This disk runs rather faster than the ones which are standard equipment on the 1640.

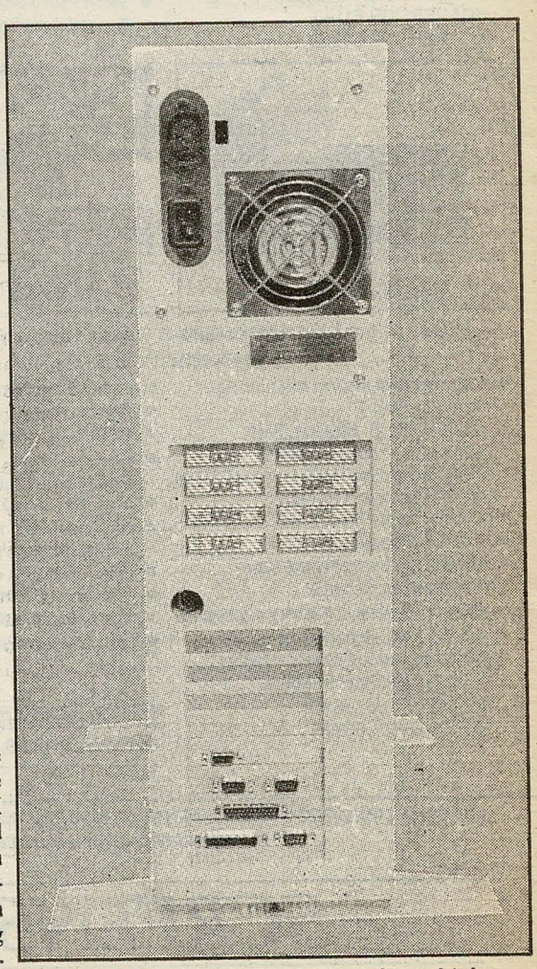
In each of the tests all disk caches were removed so that the results reflect the hardware performance only. The results of these tests are shown in the side panel 'On the bench'.

The first test was to reconfigure a *Paradox* database with 402 records, each 486 bytes long, and indexed on three fields. We were adding two fields of 10 characters each and extending one existing field by five characters. The second test measures how long it takes *Paradox* to load – it can be a long wait on sub-AT standard computers.

VP Planner was used for tests 3 and 4 measuring how long it took to load and then to recalculate a client's budget spreadsheet.

Prices

American Research isn't among the cheapest when it comes to price. In standard format (2Mb memory, 40Mb hard disk, Mono



Eight socket outputs allow the use of a multiple I/O board for multi-user operation

Continued on page 107

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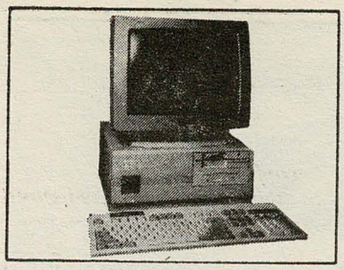

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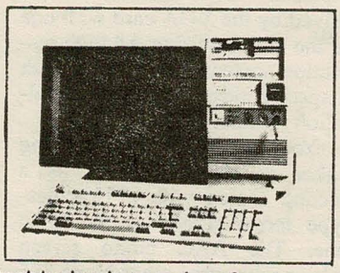

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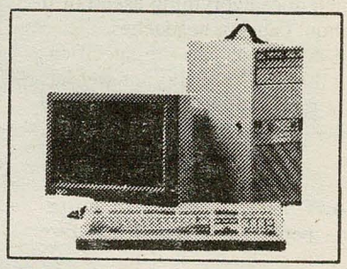
BABY VERTICAL AT

63MB 26MHz



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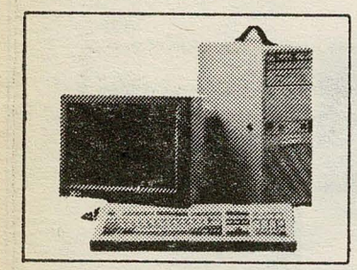

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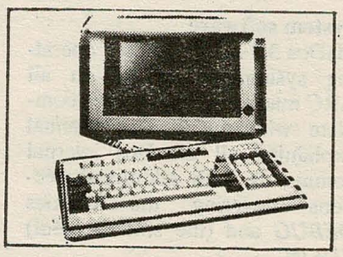

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Continued from page 105

monitor / VGA video card) the 20MHz 386 SkyScraper lists at £3,550. The 16MHz version is slightly cheaper at £3,050.

If you want an EGA colour monitor then add £305 to each of these prices. The fast Western Digital 1006 hard disk controller costs an extra £50 and is a very worthwhile option.

Conclusion

After six months was the romance still alive or had love grown cold? In one sense you could say that familiarity has bred contempt in that we hardly notice that it's there. Switched on at 8.30 in the morning it stays on all day for 12 hours or more six days a week and there's not been a single glitch in that time. So yes – you have to love a computer which does everything asked of it without causing headaches.

Looking at just the specification the ARC 386 SkyScraper has little to distinguish it from many of the 386 'tower' configuration computers on the market today. However as every car owner knows there's a world of difference between driving a 2.5 litre Japanese saloon and the latest BMW 525.

American Research has a reputation for quality products backed up by fast, personal service and this is reflected in the price.

It doesn't indulge in dubious practices like running a 16MHz 80386 chip at 20MHz or putting in slow memory so that, although the clock speed is fast, it has to run with one wait state. These are the sort of things you could find in some of the ultra cheap machines.

All ARC machines are assembled in the UK at the Croydon headquarters and are individually bench tested for at least 48 hours before despatch.

This computer isn't aimed at the single user who wants a faster AT replacement, but more at the office where a small to medium sized multi-user set up is required. In this role the ARC 386 excels delivering performance with no fuss and no hassle.

So if you're looking for a 386 computer to use as a multi-user base or file server the ARC SkyScraper is the kind of machine which should be on your shopping list.

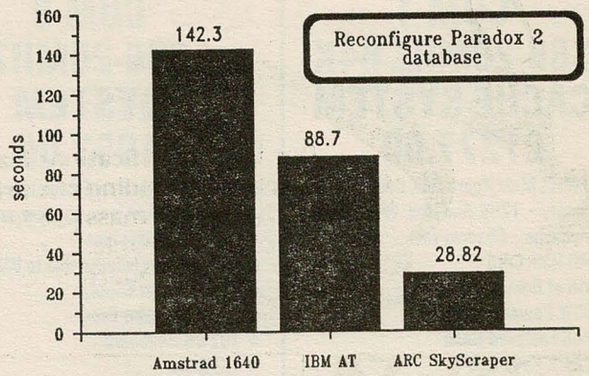
Contact

American Research Corporation,
160 Handcroft Road,
Croydon CR10 1DP
(01) 684 4144

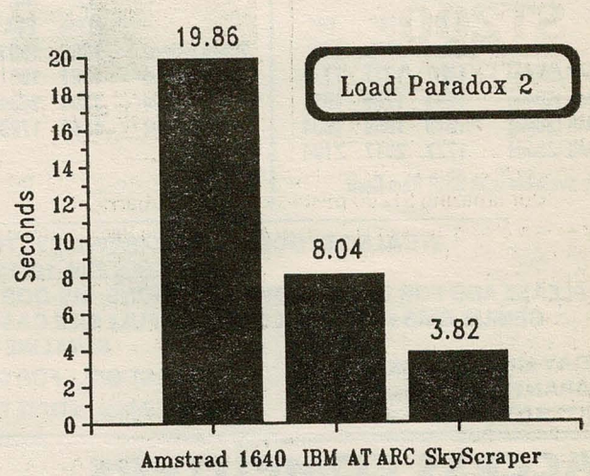
David Robinson is a professional programmer in C and Pascal and master of Saxon Computing

On the bench

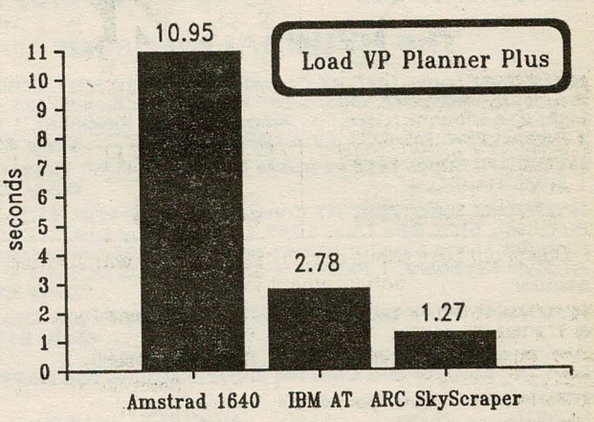
Reconfiguring Paradox
In this test we reconfigured a Paradox database with 402 records, each 486 bytes long, and indexed on three fields. We were adding two fields of 10 characters each and extending one existing field by five characters



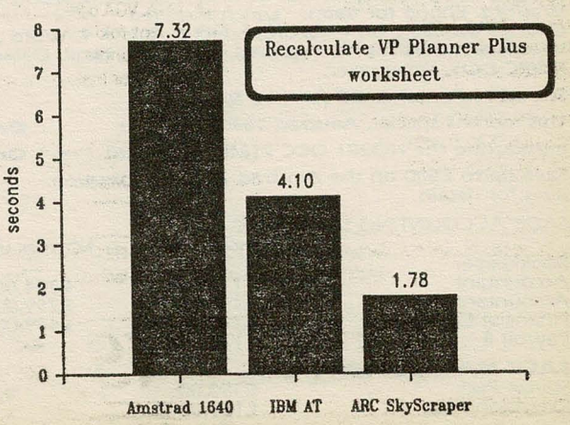
Loading Paradox
Loading Paradox is not a quick job if you are using a sub-standard AT



Loading VP Planner
The time that it takes to load VP Planner was used for test 3



Recalculation using VP Planner
In test 4 we tested each machine recalculating a client's budget spreadsheet



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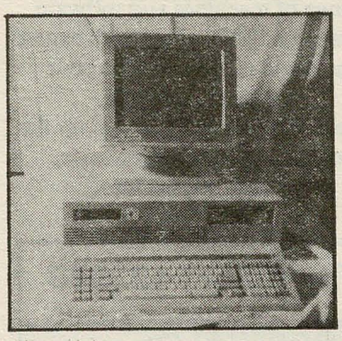

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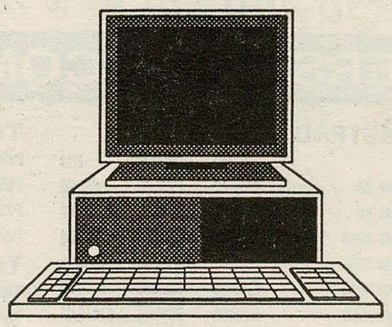

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And for my next trick

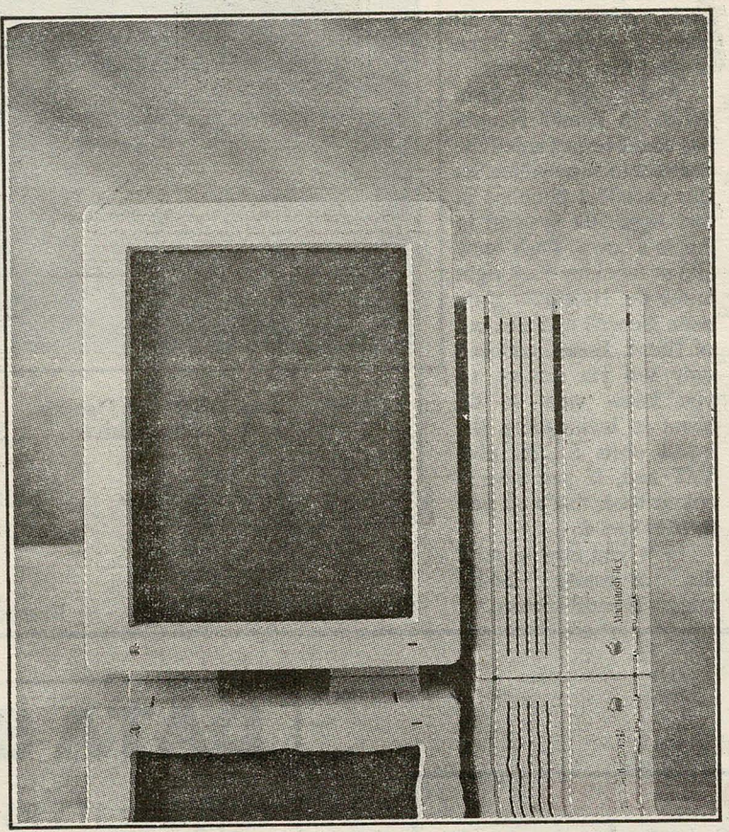
by MacBiter

As Apple continues to pull out new models faster than rabbits, MacBiter asks 'Would you give a xxx for the latest release?'

I'M HAVING a bad problem with synchronicity. I'm not getting any. For the last six months, Apple's releases of new hardware and new system software – precisely the kind of stuff that a Macintosh columnist ought to address himself to *á priori* – have fallen smack on *Computer Shopper* copy dates, so that by the time the old column comes round again, the said new Apple product is vintage news and has almost certainly been dissected at length by other publications.

The same is true of the new Macintosh IIcx, or "Mac II Junior" as we've been referring to it for months. The ending of the embargo on this rather good product came 30 seconds after the last possible moment for the last column's deadline and, as a result, the more intelligent of you are now fully aware that what we have here is a Mac IIx with three (instead of six) NuBus slots, the 68030 processor instead of the Mac II's 68020, the 68852 maths chip instead of the 68851, the plug-in ROM instead of the soldered-in ROM, and the 1.44M floppy drive instead of the 800K one. Moreover, it's a lot smaller in bulk and can be placed, tower-fashion, on its side on top of (or alongside) your desk. And it's reportedly a lot quieter.

As we hear this machine is to be sold for a price very close to that of the 'standard' Mac II, it seems to me that the IIcx is a very desirable computer indeed – certainly better value for money than its larger but older sister. It fully supports the 68030 route which Apple is obviously taking, its plug-in ROMs are just waiting for the moment when Apple begins to supply the operating system in hardware, it can hold the full eight megabytes of RAM of the range (which will be 32M once 4M SIMMs start arriving, and if anybody can afford them), and can be configured with an internal hard disk as massive as you like. But what about the missing slots? MacBiter has owned a Mac II for a year and a half. At the moment the NuBus slot bank is as fully subscribed as ever in its history. One slot is occupied by the Expanded Apple Video Card ('Toby' to Mac developers); the next is full of Neotech Image Grabber card; and the third proudly displays the superb, wonderful and highly affordable Neutral Venice 640 24-bit video card for 13-inch Apple monitors (more on this gadget in a moment). But the rest of the slots are blank and, barring the day when I tried to make six monitors run a once, have always been blank.



The Macintosh IIcx. State of the art for all of two weeks?

Moreover, NuBus devices tend to be expensive. The average price of each of the three in my machine is £1,000. There is a graphics accelerator card now on sale in the USA which costs 10 times as much. All in all, the slots don't fill up that fast, so the decision to cut the bank from six to three for the IIcx is wise, and of benefit to the majority of customers.

What stops me flogging my II and purchasing a IIcx without delay? I don't trust Apple. Oh, I trust them *personally* – the press officer in particular is a very charming chap – but corporations are less humane than humans, and have impetuses of their own, and the impetus of Apple since the launch of the Mac has been to steer as many punters in one direction as possible, and then, when they've all invested heavily, change the bases in a subtle, but nevertheless vital, manner (so as not to be accused of changing the standard), leaving the committed with no course but to grind their teeth and reach for their chequebooks. We'd all bought 128K Macs and upgraded them at great cost to 512K, only to be confronted with the Mac Plus with its 800K drives and SCSI port – another expensive upgrade. At that time we were positively assured by theTop Brass that the Mac Plus represented the way forward for Apple. It didn't. Nor – breathtaking cheek when you come to think of it – did the machine that actually replaced the Mac Plus, the Mac SE. Nor – you really do have to marvel at the hard neck of it all – did the next machine, the Mac II, brilliant though it was and is. No. We are now told that the 'x' route (68030 processor, 68851 maths chip, improved memory management, plug-in ROMs, 1.44M disk drive) is the real way forwards.

Of course, it might be true. Apple now has three 'x' machines – the IIx, the IIcx and the SE 30 – and this certainly looks like a commitment. Due at the end of this year is the so-called "NeXT-killer", the tower-configured Mac III, or whatever they call it, which may or may not have optical drives, may or may not have a 68030 processor – what's wrong with the 68040 anyway? – will probably run under 24 bits as a matter of course and may even be nearly as fast as the Dash-30, a third-party turbo Mac II with every chip and databus tweaked to its greatest clock speed (above 30 MHz), and selling at £15,000 a copy . When this comes along, will IIx and IIcx owners groan with mortification as they realise that Apple has done it again? Maybe not, but based on Apple's record, how do I *know*?

I think I'll wait a bit, just the same. I quite like my Mac II really.

Lip smackin' ace tastin'

Now (noise of hands being rubbed together and lips smacked)... the above-mentioned Neutral 24-bit card. Boy, what a product! I've gone into the subject of 24-bit video before, but just in case any of you were too bored to pay attention, what boards like the Venice 640 mean are that with a Mac II, or IIcx, or IIx or even an SE 30 with a colour monitor, you can see as many colours on the screen as there are pixels to display them, right up the limit of 16.7 million (a monitor able to handle the lot would be miles high). Why would you want to do that anyway? Because new applications are arriving as we speak which require us to edit colour images not only at this tremendous pixel depth, but also at real resolutions up to the 4,000 lines of a 35mm slide. And yes, a 24-bit Mac II can do all of these things, provided there is a suitable input device (video, a scanner) and a suitable output device (imagesetter, slidemaker, 24-bit display). No words can do justice to the kind of image quality now available with cards of this kind, even though the Venice 640 doesn't assist in any way in the creation of such images, merely in their display.

24-bit stuff has been around for about a year now and, impatient with Apple's long gestation for the 32-bit QuickDraw protocols, some developers have gone their own route. I was experimenting with a 24-bit RasterOps card/monitor assembly six months ago, and very good it was, if also very slow. But the point is that these earlier systems do not always run under true 32-

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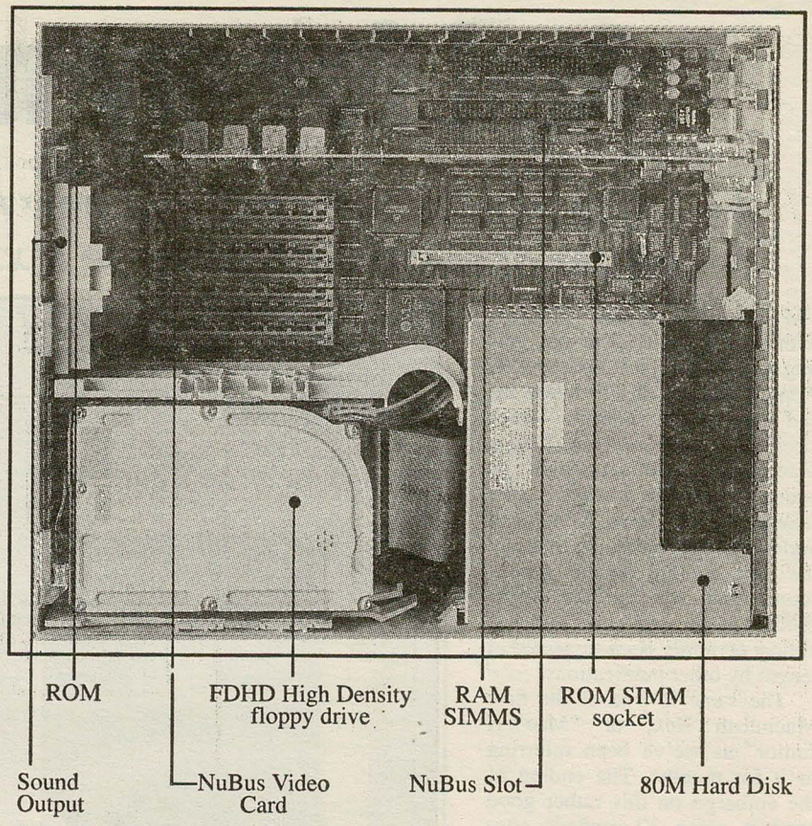
bit QuickDraw, which Apple is (at the time of writing) on the verge of publishing, and which I have myself fooled around with (the Neutral card won't run without 'Jackson Pollock', as this version of the Apple System is currently codenamed). The RasterOps that I tested (and they may have changed to conformity with Apple by now) was planar in display; that is, it painted the entire image three times, in planes of red, green and blue. This is logical but also damned slow – like computing under water – and one of the signs of the 'true' 32-bit QuickDraw is that it uses 'chunky pixels', in other words, each screen dot is painted with its eight bits of red, its eight bits of blue and its eight bits of green on the same pass. As a result it is very much faster.

Images of this depth are likely to favour just two file formats: one is TIFF, for photoseparation work, reprographics and desktop publishing; the other is a new version of PICT called PICT2+, a chunky-pixel redefinition of (planar) PICT2, with which it is downwardly compatible. The PICT2+ file format is likely to be in demand for presentation applications using slides or video displays.

The other great virtue of the Neutral board is that its use does not require a £4,000 19-inch monitor as well. It drives the standard 13-inch Apple Trinitron tube specifically, and as a result is genuinely affordable; it brings 24-bit imaging within the reach of most Mac II owners.

And it's British. Whaddya know? Neutral has also been awarded the contract to supply NeuNet (the excellent plumbed in fast Appletalk system) to Apple's own flash new HQ at Stockley Park right under the Heathrow glide path. Neutral operates out of Ilford, Essex, and can only sell via dealers, so you know what to do about it. Incidentally, the board costs £1,250 plus VAT and, if you own a colour tube, that's all you have to spend.

How you now acquire the necessary 24-bit images is another story.



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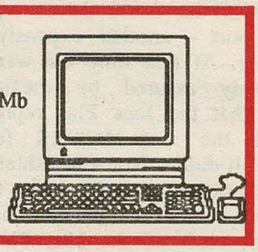

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Rants and Raves

by Huw Collingbourne

Huw finally finds a number of new releases to rave about, and tries out the new Logitech mouse on those pale and skinny Welsh legs

SO MANY mind-bogglingly wonderful programs have come my way this month that I hardly know where to begin. Or, to put that another way, people have been complaining that I never seem to have anything positive to say in this column. Isn't it about time I stopped ranting (they ask) and spent a few moments having the odd rave. What a grisly idea!

In my defence, I can only say that I didn't dream up the name for this column and I find it increasingly difficult to live up to it. I don't think people realise the mental anguish it causes a sensitive soul such as myself to have to search each month for positive things to say about the dismal world of PC computing.

The chief impediment to unbridled enthusiasm is a notable lack of wonderful PC products. I suppose some people would be prepared to rave about the latest version of *WordStar* or some wretched *Lotus 1-2-3* add-on. Well, I'm not. These things might be moderately useful in the way that a Swiss Army knife or a rubber toilet-plunger are useful. But where, in the ranks of greatness, do they stand in comparison with Mozart's *Don Giovanni* or Michelangelo's David?

So, when I describe this month's batch of programs as 'mind-bogglingly wonderful', you should bear in mind that this is not, as it might appear, an expression of awe-struck admiration but merely a shorthand form of 'less boring than a wet weekend in Bognor with Aunty Flo and the kids and nothing to read but a GW BASIC programming manual.'

Something old, something new

I am happy to say that *Lotus Magellan* is described nicely by the preceding definition. If you've managed to miss out on all the hype about this product up to now, it is unlikely that this state of innocence will last much longer. Soon there will be adverts for the thing everywhere, claiming (in all probability) that *Magellan* is the most revolutionary new concept in information management since the paper-clip. Or was that what they said about *Agenda* – Lotus's previous revolutionary product which nobody I know of has worked out what to do with yet?

The pleasure of receiving new products from Lotus is that they normally give me ample opportunity to indulge in the agreeable excesses of unbalanced criticism – ie, what's known in the business as 'a nice bit of Lotus-bashing'. Alas, *Magellan* is a great disappointment to me in this respect.

Against my natural inclination, I find myself liking *Magellan* rather a lot. It is useful, fast, well-designed and realistically priced. And, better still, it doesn't look in the remotest bit like a spreadsheet.

Other Lotus programs (from the word processor *Manuscript* to the information manager *Agenda*) insist on dividing up chunks of text into curiously spreadsheet-like rows and columns. Lotus's integrated package, *Symphony*, goes even further – its word processor and database are merely superimposed upon a vast all-pervasive spreadsheet which lurks only partially hidden in the background. But *Magellan* breaks away from this iniquitous tradition. It doesn't even have one of those nasty horizontal menu systems which I'd assumed were obligatory in Lotus software.

OK, that's what *Magellan* looks like. But what does it actually do?

In a sense, it doesn't do anything particularly new or unusual at all. At first sight it seems to be a fairly standard disk organiser rather like *XTree*. For good measure, it also does a bit of text-retrieval just like one of the many specialist packages available. And it wraps the whole lot up in a friendly 'point and shoot' Dos interface similar to a program such as the *Norton Commander*.

But in fact, by combining all these existing bits and pieces, *Magellan* does the Frankenstein-like trick of creating something that is genuinely new. It provides a complete disk and program organiser which lets you view your work not only in the standard way as a collection of files and directories, but also in a way which brings out 'hidden' relationships between files. You could, for example, tell *Magellan* to display all those files created by *WordPerfect* even though they may be scattered throughout numerous directories or on several disk drives or 'logical drives' on a high capacity hard disk.

You aren't limited to such simple groupings either. You could just as easily view only those files which contained references to 'leather posing pouches' or all the *dBase* files dealing with the accounts of 'Mssrs Gribbit, Gribbit and Slap'.

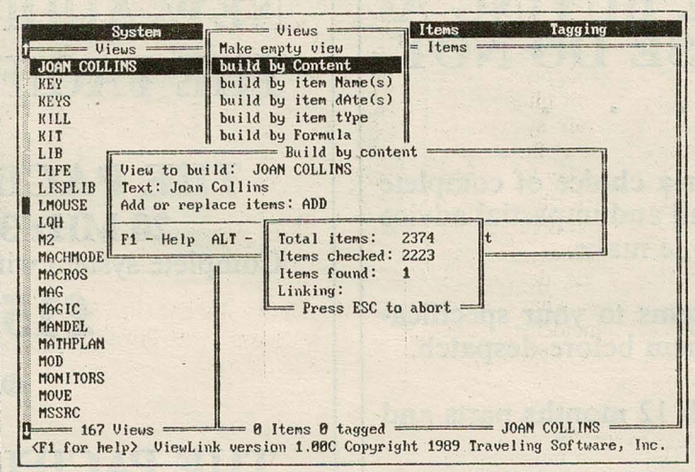
To create views of this sort, you must first instruct *Magellan* to search for the specified text throughout all the files in a particular file group. A file group might be all *dBase* files, all files ending with '*.txt' on drive D:\ or even all files of all sorts on all disk drives.

Magellan then searches, not through the files themselves, but through an index which it creates when it is first installed. This index is already optimised for high speed searches so text can be found very rapidly.

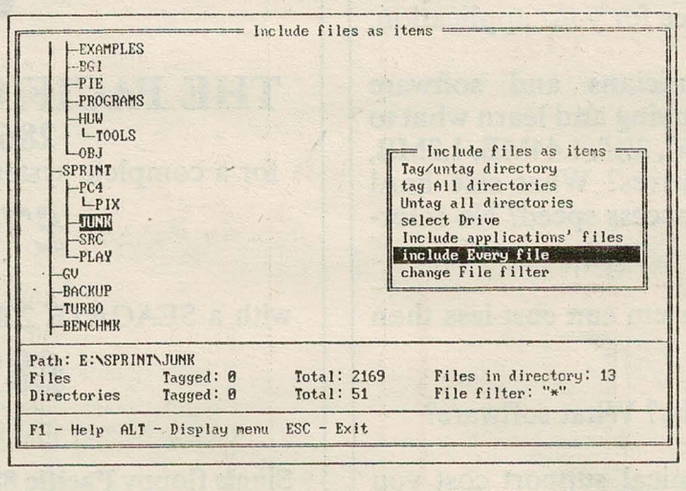
Once the search is complete, *Magellan* displays the names of all the files containing the text. Now you can view the contents of each file with the relevant text highlighted. Many popular business programs have special support so that when one of their files is displayed, the screen shows the contents as they would look inside the original program. Normally if you examined a

Continued on page 115

ViewLink



Using ViewLink, you may choose to build 'views' according to the name, date, contents or type of file. In this case, ViewLink is searching for all the files containing the words 'Joan Collins' – depressingly, it has only managed to find one...



Although ViewLink can map the directories of a disk as shown here , this is only for the purpose of locating files to be added to a view. It is not possible to do traditional file maintenance tasks here

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WordPerfect file outside of *WordPerfect*, a *1-2-3* file outside of *Lotus 1-2-3* or a *dBase* database outside of *dBase*, you would see an assortment of meaningful text and indecipherable junk.

When you look at the same files using *Magellan* they are formatted more or less correctly. A double spaced *WordPerfect* document is shown double-spaced, *Lotus* data is shown inside a pseudo-*Lotus* spreadsheet and *dBase* records may be viewed just as they appear in *dBase* itself.

To load one of these files into its parent program, you just press ENTER over the file name and *Magellan* 'launches' the file into *dBase*, *WordPerfect* or whatever.

Dire straits

Magellan is very keen on silly terms such as 'launching' files, 'mapping your course' and 'exploring' your hard disk. If you hadn't already got the allusion, let me explain that *Magellan* sees itself as the PC's answer to the 16th century Portuguese explorer who found himself in the difficult straits to which he gave his name.

Well, I suppose there's a certain schoolboy logic to the idea. But it's all very much over-stated – at least, if the pre-release manual is anything to go by. I can just about take the idea of keeping files in 'ship shape' but 'shipping' them to the printer is definitely stretching the analogy just a bit too far.

There is more than a hint of the same obsession with silly words in Traveling Software's *ViewLink* too. Although this only uses one maritime metaphor – 'launching' programs – it makes up for this with a whole heap of techno-speak and gobbledegook – gone are 'files' and 'documents' and in their place we have 'views', 'domains', an 'associative access manager' and 'hyper-access'.

ViewLink is a program which many people (well, journalists anyway) regard as a direct competitor to *Magellan*. The two programs undeniably do many of the same kinds of things. They both let you group together programs and files according to meaningful relationships instead of directory structure. And they both let you load files into the appropriate application programs just by selecting the file name from a menu.

But the differences between the programs are just as marked as the similarities. Whereas *Magellan* assumes that you may often want to view files according some association you suddenly think of, *ViewLink* assumes that you will want to create fixed and permanent views. Then, once you have created a view, *ViewLink* automatically updates it whenever a relevant new file is created.

Let's say you have created a view of all files referring to the Joan Collins Fan Club. Now, from *ViewLink* you load up *WordPerfect* and write a letter called 'Fantasy.txt', in the course of which you happen to mention your unrequited passion for the Joan Collins Fan Club – which is something I'm sure many of us do in the course of a day's work. Although the file name gives no indication of the document's contents, *ViewLink* will be monitoring the text you enter and will automatically add the file to your Joan Collins Fan Club View. If you have a different view called 'Fantasy', the document will be added to that too.

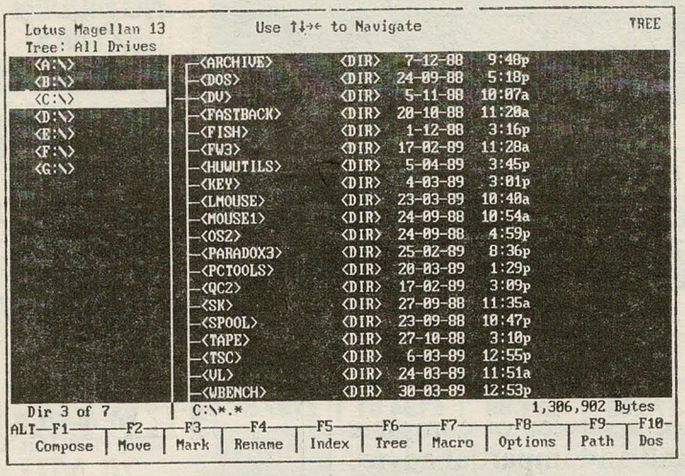
Although it's not a bad program, *ViewLink* suffers from comparison with *Magellan*. It is slower in operation than the Lotus product and is not good at doing ad hoc searches for information. Also, it requires that the user should invariably load programs from *ViewLink* rather than Dos, otherwise new files will not be added to the appropriate views. *Magellan*, on the other hand, simply demands that any new data should be added to its index by selecting the 'update' function from time to time.

But the thing I most dislike about *ViewLink* is its total lack of any directory-based file mapping. However useful 'views' may be, I can't believe that users won't want access to the normal Dos disk structure at some point. The only time *ViewLink* acknowledges this structure is when it maps out a disk for the purpose of adding files to one of its views. To me, this smacks of monomania and downright unhelpfulness. For anyone interested, *ViewLink* costs £105 from Softsel (01) 568 8866 and *Magellan* costs £90 on an introductory offer but £140 after September from Lotus (0753) 840281.

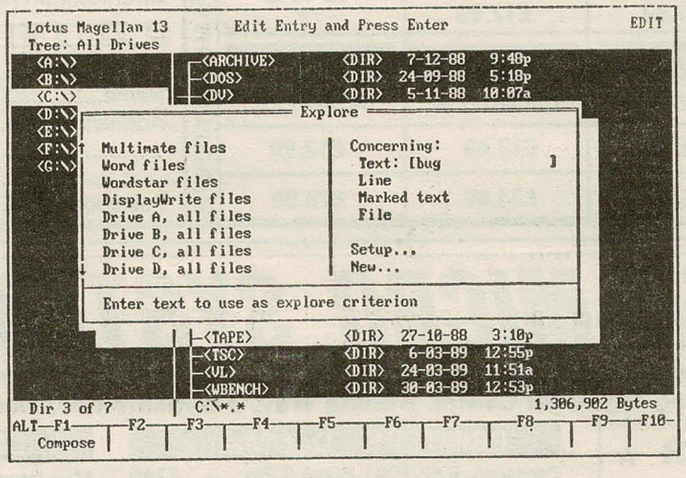
Corruption

PC Tools from Central Point Software is another program (or rather, a collection of programs) about which I am relatively happy to enthuse. I have always preferred *PC Tools* to *The*

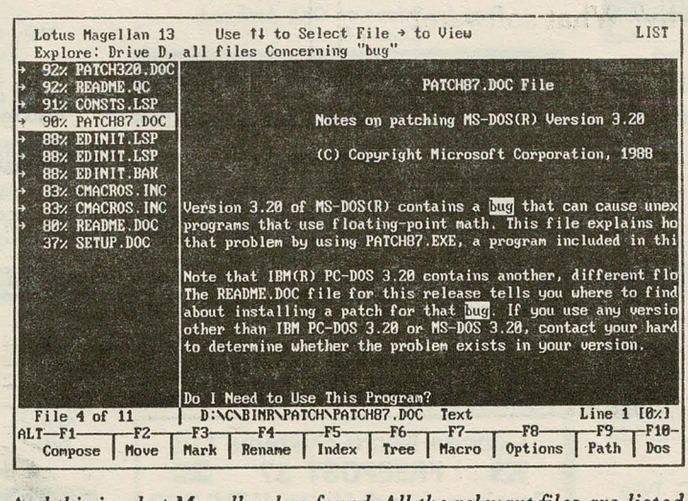
Magellan



By contrast with ViewLink, Magellan provides a very capable file manager which lets you navigate the directory structure of one or more disks, viewing or editing files as you go along



Magellan has a really useful 'explore' function. This lets you search through a selected category of files or even all the files on all disk drives. Here, I am trying to find all files which contain the word 'bug'

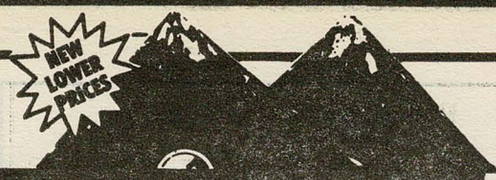


And this is what Magellan has found. All the relevant files are listed on the left-hand side of the screen. The percentage symbols represent a 'score rank' which increases according to the number of times the specified text appears in the file. The file contents are shown on the right of the screen with the matching words highlighted

Magellan sees itself as the PC's answer to the 16th century explorer

Continued on page 117

Micro Mountain!!



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Continued from page 115

Norton Utilities. Principally because it provides more utilities for less money. Not only do you get the usual disk-doctoring stuff to browse through files and undelete files you've accidentally erased, but you also get a directory manager plus a disk back-up program, a cache to speed up disk accesses and a few more things besides.

The latest release (*PC Tools 5.0*) goes even further. In addition to all the old stuff, it throws in a PopUp 'desk-set' with virtually all the same stuff you'll find in *Sidekick Plus* and several things you won't find there such as a *Superkey*-like macro-generator and a card-index database. On top of that, the main set of tools has been rewritten to make them neater and more user-friendly. The directory-organiser can now log two disks at the same time and display disk maps in separate windows. And there is a completely new backup program which gets a lot closer to rivalling its famous competitor, *Fastback*. At a cost of just £49.95 for the lot, it almost seems that Central Point is being recklessly philanthropic.

This all sounds too good to be true, you might think? Alas, it is. Every cloud has a silver lining, every barrel a rotten apple and every good program a bug.

The major bug in *PC Tools 5.0* is that its file-compression program (laughably called *P C Secure*) may corrupt the files it's compressing. To be fair, the manual does warn that 'operated improperly, *PC Secure* changes from a data security program to the electronic equivalent of a paper shredder.' What the manual doesn't say is that the program may also suddenly switch itself into paper-shredding mode just on a passing whim. If you buy it, don't try it!

Less serious, but nevertheless infuriating, are the bizarre omissions from the PopUp deskset. Although it combines a huge range of utilities including multiple notepads and outliners, ASCII table, clipboard, communications, calculators, appointments schedulers, and even a spelling checker, the utilities themselves infuriatingly lack some of the most basic functions. The outliner, for instance, doesn't have word-wrap while the notepads have no keystroke command to delete a line of text. Worse still, the desk-set absolutely refuses to run inside a *Desqview* window! Since I use *Desqview* all the time, this means that the *PC Tools* desk-set is useless to me.

Some people would argue that the flaws in *PC Tools* should be enough to act as a deterrent to any prospective purchaser. There is certainly a case to be made for rejecting any program which is known to corrupt data as dramatically as *PC Secure* does.

However, I don't take that view. It remains the case that *P C Tools 5.0* is extraordinarily good value for money. If you want a good set of disk tools, I don't know of a better one. The backup program also appears to be good – it lets you back up by date, directory and file specifications, does full or incremental back-ups and has error-recovery to restore files even from a damaged disk.

I haven't encountered any problems at all with the backup, the disk tools or the file manager. And, in spite of some reservations, the PopUp deskset compares well with other programs costing considerably more than the entire *PC Tools* package. I am told that *PC Secure* is now being fixed and that everyone who has already bought *PC Tools 5.0* will be ussued with a replacement. *PC Tools 5.0* is available from Evesham Micros: (0386) 765500.

Nasty tails

Yet another good thing which has come my way recently is the new Logitech mouse. This is one of those fashionable beasts which looks distinctly as though the design came before the function. At first sight this could be anything from a portable torch to a lady's leg shaver (at least, in my limited experience of portable torches). In terms of the sheer improbability of its shape it even surpasses the design of the new Microsoft mouse which all too clearly betrays its origins as a travelling soap dish.

The Logitech mouse demands quite close examination before any hint is given of its true purpose. Eventually, the recessed buttons (camouflaged as mere decoration) and the ball set into the base give the game away. However, its true identity is brilliantly concealed, which makes the device a wonderful conversation piece and the ideal thing for party guessing games.

I suppose its design could have a more practical explanation too. Its highly arched back is just the right shape and size to fit into the palm of the hand, although why anyone should wish to squash a mouse beneath the weight of an entire hand is not clear to me. Personally, I prefer the more effete 'fingertip' control method.

The mouse comes with the some of the same utilities as its predecessor including a thing called 'click' which automatically invokes the appropriate menus to any program you load from Dos and lets you adjust the speed of the mouse pointer movement on the fly. It also has its own PopUp mouse-menu compiler which lets you program the mouse buttons for use with standard applications. A new feature called 'ballistic control' makes the pointer move further across the screen when you move the mouse rapidly than when you move it slowly. All in all a good mouse and, at £95, at a good price.

However, I confess to being a little surprised by the Logitech program for adding your own mouse menus to the list recognised by Click. The reason for this surprise is the copyright notice embedded in the Clickadd.com program file. This says, plainly:

Copyright (C) 1985 BORLAND Inc

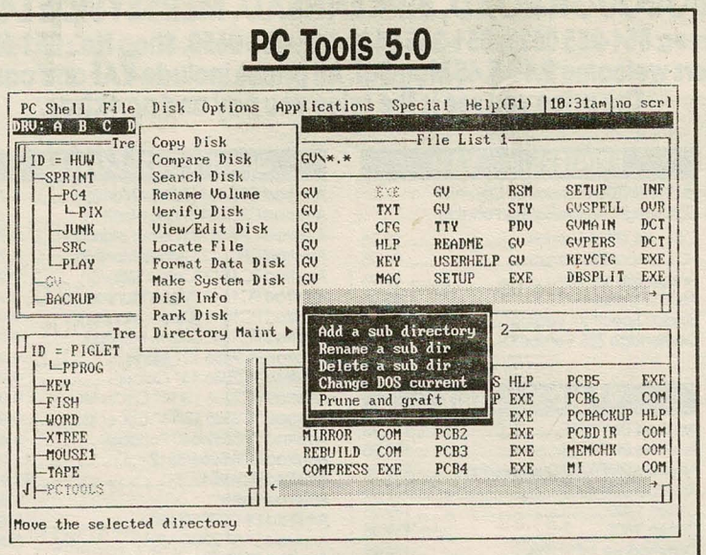
And that means that *Clickadd* was written and compiled by *Turbo Pascal 3.0*. Which is odd, since Logitech has long been promoting its own *Modula-2* compiler as a supposedly better alternative to *Turbo Pascal*. There is even a Logitech translator to turn *Turbo Pascal* programs into *Modula-2* ones. Why, then, is Logitech still using *Turbo Pascal* in preference to its own compiler? Is there something that *Turbo Pascal* does which Logitech *Modula-2* doesn't do?

Another mystery which has come to my attention is the forthcoming upgrade to *PlanPerfect*. This is the spreadsheet from the WordPerfect Corporation which, in its current incarnation is labelled 'version 3.0'. In June or July, a new version is to be launched. But this will not be called *PlanPerfect 4.0*, which seems reasonable, but *PlanPerfect 5.0* which doesn't.

The rationale behind this is that the user interface of *PlanPerfect 5.0* will be compatible with *WordPerfect 5.0*. Am I being unduly critical in suggesting that this reasoning might be just a touch on the spurious side?

For some reason, marketing folk tend to find big numbers impressive and will go to any lengths to attach them to their products. I don't know why that is. When a product has been through lots of versions, the chances are it's been hacked at by whole teams of people, few of whom remember or care about the original concept. Rather like one of those dusty old 1960s Zeffirelli opera productions which is creakingly wheeled out by Covent Garden from time to time: lots of gold paint to hide the cracks but no Maria Callas.

Look, I really am trying to be positive but it's beginning to feel like a strain. I'm afraid I'm going to have to revert to my usual cynical self next month...



PC Tools 5.0 has a strictly traditional disk organiser with a directory-based tree-map of the disk. The 'prune and graft' feature is particularly useful. It lets you move entire directories from one place on the 'tree' to another

At first sight the Logitech mouse could be anything from a portable torch to a lady's leg shaver

Huw Collingbourne is the editor of the PC Buyers Guide. In reply to numerous enquiries, he would like to make it quite clear that he is not the same Huw Collingbourne who appears on page 37 of the August 1988 edition of 'Wet, Wild and Willing' magazine

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PD cocktail

by Rod Smith

The Shareware bartender provides the recipes for this month's tasty new releases. Fancy a Slow Comfortable Screw?

ANOTHER bumper month for new releases for the IBM PC with 37 new disks. Again we have a huge variety of programs released, including the first Shareware thesaurus, an SQL database, the ultimate fishing game, how to make a Slippery Nipple, plus lots more. Don't forget, the disk numbers mentioned here are only relevant to the PD Software Library. All programs mentioned should be available from your local PD dealer, though on a different disk number.

Computer Shopper BBS

Each month, some of the programs mentioned in this column will be posted for free download on the *Shopper* BBS (see end of article for the number to ring). This month you can download *Dracula in London* from disk 1361 and *CCI Home Budget Manager* from disk 1365.

Business and finance

QUE Accounts on disk 1367 is an accounting system designed for handling the books of multiple companies and departments and includes such features as password protection by company; full reporting audit trail; update or correct data from trial balance display, etc. Uses *dBIII* format compatible data files. Requires 512k RAM and hard disk.

Simple Invoice/Statement on disk 1368 includes the program *Invoice,* which provides a simple invoicing system for the trader who requires invoicing but maybe does not want to go to the trouble of a full accounts system. This is a simple 'fill in the blanks' system and get an instant invoice print out. Two invoices are printed per sheet (so that you can keep a copy) or multiple copies can be printed. Data entered is saved to disk for later examination, editing, reprinting etc. Up to 25 items per invoice are allowed and provision to handle taxes and discounts is provided, along with the facility to customise the letter head to that of your business. *Statement* is a similar program, but geared for longer lists of items and for keeping a running total for a particular customer.

PCPM Project Management on disk 1373 is a major update to previous releases of this program. It uses the critical path method project management system for handling up to 1,000 task points. It produces full reports showing precedence-succession; cash flow analysis; Gantt charts etc. Includes facilities for sub-contractors, holidays, customisable calendars, data testing. This version of the program is a stand-alone compiled version, but source code is also included. Hard disk required.

The *Lotus Worksheet Collection* on disk 1357 includes a macro language tutorial; a chequebook template with reconciliation functions; a loan analysis; a mailing system template with three across label printing; a password protection system; a mailmerge tutorial showing how *Lotus* can be used to merge names, addresses and amounts into letters. Requires *Lotus* version 2.

If you need to keep a record of how your computers are being used, try *Logit* on disk 1374. This is a comprehensive PC usage log system. It can be run as a PopUp program or from a batch file. *Logit* stores in *dBIII* format compatible files, clock times, elapsed times, keystrokes per hour, number of keystrokes, program and path names and percentage of computer use by program, etc. Will output summarised reports to printer or DIF file. Requires Dos 2 or above and hard disk. (Watch out that your boss doesn't put one of these on your PC without you knowing, or all those times when you stopped to play *Hack* or *Space Invaders* will be on record!)

If you keep hearing about Structured Query Language (SQL) and are wondering what it's all about, here's your chance to try it out without spending a fortune. *SSQL* on disk 1348 is an implementation of SQL. This is a very powerful database system, based on accessing data by means of data tables which can be created to define the way data is accessed. This form of relational database is rapidly becoming the industry 'standard' for advanced data management. The performance of *SSQL* compares favourably with commercial products costing several hundred pounds. This Shareware version is a full working version, differing from the registered version only in its lack of a printed manual, but the on-disk documentation is provided. Well worth a try.

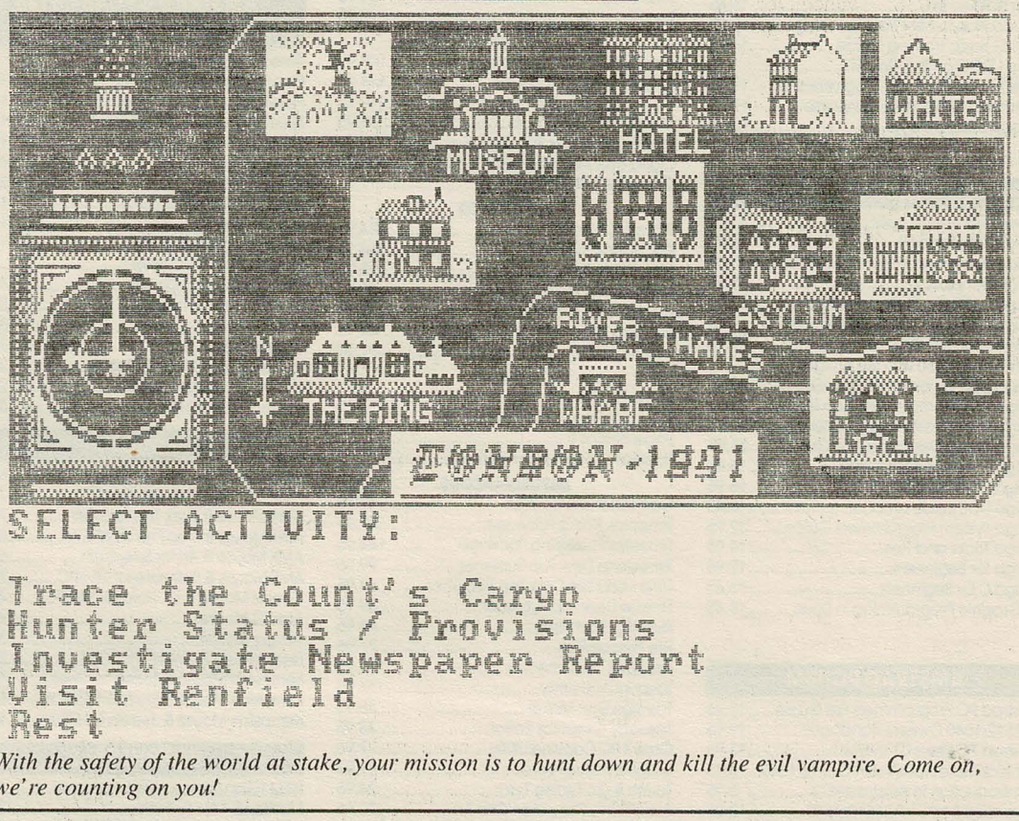
CCI Home Budget on disk 1365 is a complete personal finance system to keep track of your income and expenses. It allows up to 96 user-defined categories to be set up (eg food, rent, phone, savings) with 16 transaction types (eg credit, cash, cheque, refund) in 10 user-defined accounts (eg current account, savings stock). From the data entered it can report totals for month, year, bank reconciliation, trends and so on. It is fully menu-driven and requires Dos 2.0 or higher, 256k RAM and floppy or hard disk, colour or mono display.

Desktop publishing

It seems most people who are into DTP have an insatiable appetite for more fonts, pictures and gizmos to make their documents more interesting. If you are one of these, we have a few disks this month which might be what you are looking for.

HP Laserjet Fonts on disk 1358 includes Myopia, a tiny font complete with a program to print two-up 80 column text at 120 lines per page; Teacher is a font which imitates kids' writing. Flyspeck is a another tiny font,

Dracula in London



With the safety of the world at stake, your mission is to hunt down and kill the evil vampire. Come on, we're counting on you!

even smaller than Myopia. This one comes with a program to print three-up 80 column text at 184 lines per page! Impaired is a 10pt font specially designed to be easy to read for the visually impaired and yet still be reasonably economical with paper. Requires HP Laserjet or compatible printer.

Disk 1343 contains 44 add-in fonts; these include: Future 9/12/18 and 24pt; Ham 14; Human 18/36; Vancouver 9/10/12/14/18/20/24; Vienna 18; Whitestown 9; Mystic 14; Kansas 10; LED 24; Tiffany 12/24; Uncial 12; Steel Brush 12/24/36; Stiletto 14; Square 24; Starfleet 9/12/18/24; Santiago 12; Science Fiction 12; Scottish 12/24; Oblique 12/18; Ophir 12/24; Playbill 12/18/ 24 and McCloud 36.

The two disk set on 1360A and B contains a number of Printmaster icons in compressed archive format and unpack to four disks containing more than 2,000 icons for use with Printmaster. A huge range is covered; from Ace to Zig-zag, an Icon for all occasions!

A huge collection of animal pictures can be found on the nine disks 1349 A to I. The pictures are in *PC Paintbrush* PCX format, which can be used in conjunction with desktop publishing packages such as *Ventura*.

Disk A contains dogs: beagle, bulldog, collie, greyhound, mastiff, terrier, foxhound, spaniels. Disk B contains big cats: cougar, lion, jaguar, lynx, leopard, panther, tiger. Disk C contains African animals: anteater, antelope, baboon, camel, elephant, gnu, hippo, rhino, zebra. Disk D contains North American animals: armadillo, badger, deer, fox, moose, raccoon, ox, wolf, wolverine. Disk E, Arctic animals: otter, polar bear, reindeer, seal, walrus. Plus rodents: beaver, dormouse, gerbil guinea pig, mouse, rat. Disk F, farm animals: bull, cow, goat, ox, pig, sheep, rabbit. Disk G, miscellaneous animals: bat, kangaroo, sloth, peacock, platypus, porcupine, puffin, skunk, sloth, turtles. Disk H, birds: falcon, owl, duck, partridge, quail, sparrow. Disk I, birds: gull, rooster, stork, swan, turkey, woodpecker. Note that these pictures are not photographs but are good quality woodcut reproductions.

The Clip Art collection on disk 1371 includes car logos, borders, office equipment, masks, a cowboy, a biplane, a smurf etc. A total of 19 *MacPaint* .MAC picture files from Whiplash software for inclusion in DTP applications.

Desktop helpers

The *Desktop Collection* on disk 1329 is a collection of programs to make using your computer easier. It includes *PCBoss*, the popular, easy-to-use file manager, *PFM* (*Personal File Manager*) another file management system, *AM* and *PCMenu*, which are simple Dos menu systems, quick and simple to set up; *QREF* which is a handy Dos help facility with the ability to add your own entries for hard-to-remember routines, and *Omega* and *PCDiary* which are handy calendar programs (*PCDiary* is RAM-resident).

Disk 1345 contains another Desktop tools collection including: *MyDesk*, which is a comprehensive PopUp, providing editor/wp, alarm clock, ASCII tables, calendars, printing, appointments reminders. Needs HD and Dos 3 or higher.

Tarraltime is a program which tracks and displays local times for as many as 44 cities around the globe. May be used in 24- or 12-hour time display and also provides for alarm clock from any of the city time zones. *$uper* is a PopUp ASCII table, colour chart graphics character chart, Epson printer set up, memory peek and poke.

Prodex Plus is one of those programs which was originally sold through the usual commercial channels, but has now become a Shareware product. It is a sophisticated PopUp system providing an address book, a phone dialler with log, a note pad, a text editor, a to do list, future dates tickler file, area code list, cut and paste. This software has had many good reviews in the American computer press. You will find *Prodex Plus* on disk 1346.

Education

Word games for juniors on disk 1336 is a collection of word games including: *Categories* – choose the word that fits the category; *Verbs* – choose the matching verb and noun; *Compare* – find the biggest, deepest, smallest etc; *Wordfind* – a hidden words puzzle; *Synonym* – find them; *Jobs* – choose it from the description; *Odds* – find the odd one out; *Sentence* – unscramble it; *Opposites* – pick them out; *Plurals* – give the plural of a word. The word lists with these programs can be added to as needed. CGA needed.

Teachers Helpers on disk 1337 includes: *AEIUS* a student grading system which handles up to 20 classes of 48 students with 64 grades. Works like a spreadsheet to allow easy entry of grades and good reporting facilities with output in grade or student number order. *Testwriter* is like a special purpose word processor for creating tests. Its facilities include multiple choice, true/false and narrative answers; a question bank where one can search for suitable questions to includes using split screen mode; question randomisation; disk storage of tests and printout of test with answer sheet.

Food and drink

Bartenders' Guide on disks 1363A and B was written with the assistance of a professional bartender who provided the experience, recipes, and serving and preparation suggestions. It provides a very full and comprehensive list of drinks, mainly alcoholic, but some non-alcoholic as well. Drinks are put into categories which include martinis, wine drinks, champagne drinks, Polynesian drinks, coffee drinks, cream drinks, highballs and juice drinks. This is just the thing to spend many happy hours of experimentation or to impress your friends with some fancy brews like a Slippery Nipple, a Fuzzy Navel or maybe a Slow Comfortable Screw against the Wall. (Don't blame me, these are names of drinks from the database). Requires Dos 2.1 or higher.

Kitchen Helpers are on disk 1364. These include *Slimmer*, which is a program to help you weight watchers compute your ideal weight from your size, build activities and gender. Your calorie intake to reach and maintain that weight is given and the built-in calorie tables for some 1,000 kinds of food will show you how much of each you can eat. This program is based on the American Heart Association's 'Eater's Choice' program and the emphasis is on cholesterol and calorie control. Facilities are also provided to keep records and charts of your weight change. Also on this disk is *Herb*, a program providing a cross reference of herbs and spices and which foods are best prepared with which. The basic source code is supplied as well as the stand-alone compiled version.

Games

Dracula In London on disk 1361 is a role-playing adventure game with graphics for one to six players. It follows the plot as given in Bram Stoker's novel. It works best with a group playing but, lacking this, one person can play several roles at the same time. The object is for the characters to work individually or as a team to destroy the poor old Count, the one we all love to hate.

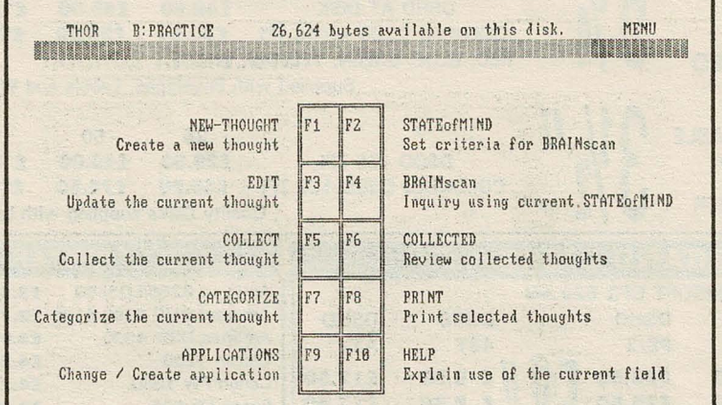
Pinball Games on disk 1369 contains 10 good pinball games created with the Bill Budge Pinball Construction Set. Games include: *Zipper, Star, Spooky, Runway 48, Par3 Golf, Money maze, Double, Circus, Chute* and *Black Box*. All require CGA.

The prolific Tommy is still in action – I think we get at least one game a week from this guy. His latest offering is *Tommy's Monopoly*, a good version of the popular board game for two to eight players (any of whom may be represented by the computer). The classic long game may be played, as well as a short version, with or without a time limit. Automatic save and restore is featured – the properties are from the American version of the game (ie based on streets in Atlantic City, New Jersey). All standard game features are included (Chance, Community Chest, Jail, Free Parking, auctions, mortgages, rent doubling if colour group owned). Works with colour or monochrome displays. *Tommy's Monopoly* is on disk 1375.

Basstour on disk 1370 is the ne plus ultra of fishing games. The scenario is a three-day bass tournament where you have to make the heaviest catch in the five fish limit. You have 30 oppo-

Continued on page 123

Thought Organiser



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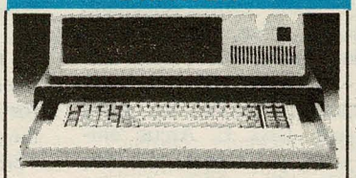

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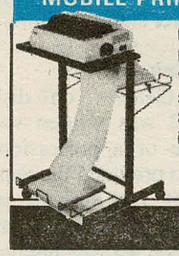

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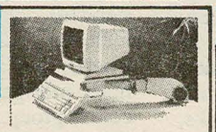

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nents played by the computer. You have a selection of tools, an outboard motor, six rods, and lots of tackle. Three levels of difficulty and six different lakes are included. Conditions change each time you play to simulate changing weather etc. Also on this disk is *Fraktal,* which allows you to design and display a fractal kaleidoscope, from parameters you enter. Save and recall set ups is included as well as randomly generated fractals. Both programs require an EGA-type display.

Megagopoly on disk 1335 is a game where your object is to make a fortune by careful investment and gain financial independence within 20 years starting from an inheritance of $100,000. Economic conditions and risks have to be coped with to be successful.

Strategy War Games on disk 1333 contains *NCRisk,* which is a full Risk game for two to six players. It runs on CGA, EGA, VGA or Hercules, and needs Dos 2.1 or higher. *Seahunt* is a Battleship game for one player against the computer. It has 10 levels of play complete with sound effects and quotes, joystick or keyboard control. It requires CGA.

Tele Chess on disk 1334 is a two-player chess game which allows you to connect, via a modem and the telephone network, to your opponent. Features include dual clocks for timed games, message features, save and restart game, mouse support and printing of games for hard-copy review. Works with Dos 3 or higher, CGA, VGA, EGA or Hercules graphics monitors and Hayes-compatible modem.

Starload on disk 1338 is a huge graphics *Star Trek* game with many interesting features such as pickup, currency exchange, capture etc. Mainly uses function keys for control and requires CGA card.

Graphics

VGACAD is a full-feature paint/drawing system which uses the VGA card in 320x200x256 colour mode. Features include: selectable palettes/colours, circles; ellipses; rectangles; squares etc; filled or hollow; zoom; shrink; grey scales; hue curve smoothing; mouse support; cut and paste; image processing etc. Requires VGA 512k and an AT type machine recommended. You will find *VGACAD* on disk 1342.

Charts Unlimited on disk 1351 is an object-orientated drawing package with a *Lotus*-style command system. Being object-orientated, drawings can be scaled up without the loss of definition associated with pixel-based systems. Libraries of ready-made objects and symbols are provided to simplify the creation of flow, organising charts, electrical circuit diagrams, floor plans, Gantt charts. Good text handling facilities are provided as well as a good context sensitive on-line help system. Printers supported include Epson, Anadex, Citoh, HP Laserjet, IBM, NEC, OKI, Toshiba etc. Printing also may be done as a background task while you continue to work with the program. Requires CGA, EGA, VGA or Hercules graphics adaptor.

Mindchart is a versatile business graphics system for producing line, surface, scatter, bar, stacked bar, pie and gantt charts. One, two or four charts can be displayed on the screen at any one time. Data entry can be from keyboard or data file. Charts may also have additional drawings, lines, arcs, text etc put on them. Program documentation is limited but a good on-line help system is provided plus many demo charts showing the program operation. *Mindchart* is a two disk set on disks 1341A and B and works with CGA, EGA or Hercules.

The collection of graphics utilities on disk 1344 includes *Cartog,* which produces a hi-res world map in Mercator, equidistant cylindrical sine, Hammer or Orthographic projections with adjustable centre of longitude. Pascal source is included. *Mandle* displays Mandlebrot and Julia sets with selectable iterations and parameters. Maths background description is covered.

Works with CGA, EGA or Hercules. *Titler* is a program to produce PCX format files from a text file and HP Laserjet soft fonts. This enables you to produce some very fancy looking banners and headings. Note that the files produced may be too large to read into *PC Paintbrush* direct.

Hobbies

The Ham radio collection on disk 1350 includes a number of useful utilities for the radio ham. *Hamcom* is a comprehensive user-supported packet comms program. (With *Hamcom* you have to contact the author to get an access password to use the program). Also included is *Grid* which is a memory-resident program designed to work out Maidenhead squares for any latitude/longitude or vice versa. *CBBS-VI* is a packet BBS system in C and ASM source code. (Note, this program has no documents apart from comments in source file). *Finder* is another packet BBS system from WN6I and N6KL. Although it comes with a sysop manual, further information on this system is available in the paper from the 6th ARRL Computer Networking Conference.

Photomaster on disk 1339 is a special purpose database program for the serious amateur or professional photographer. It provides extensive facilities for tracking information relating to pictures, client information, publications, film info, categories, location, quality codes etc. Reporting facilities include captions for slides etc. Uses *dBIII* compatible data file format. 384k RAM and hard disk recommended.

Now for a program which will be useful to those involved with running voluntary organisations. *Volunteer Network* is a three disk set on 1340A, B and C and is a special database system for organisations using volunteer helpers. It allows tracking of skills, schedules, duties, hours worked and activities of volunteers. This program uses *dB3* compatible data file format. Requires 640k RAM and hard disk.

Any sports administrators out there? Disk 1355 contains *Bikestat* which calculates the characteristics of multi-geared bikes accounting to different wheel, tyre, sprocket size and teeth etc. *Statpak* is to keep batting and fielding stats for up to 12 teams and 220 players. Also on this disk is a runner's log system and a baseball team admin system, plus a basketball pool maintenance system.

Cakewalk on disk 1331 is a 256-track music record/edit/playback system for use with a Roland MPU-401 compatible MIDI interface and a MIDI synthesizer. Using pulldown menus, options may be selected either by mouse or keyboard. Options include record, save to disk, load previously recorded work from disk, edit individual tracks, etc. This is a cut-down version of a full commercial package, but it has capabilities enough to give you a good feel of the potential of the full program. Minimum requirements Dos 2.0 or later, two floppy drives (hard disk recommended), Roland MPU-401 compatible MIDI interface and MIDI synthesizer.

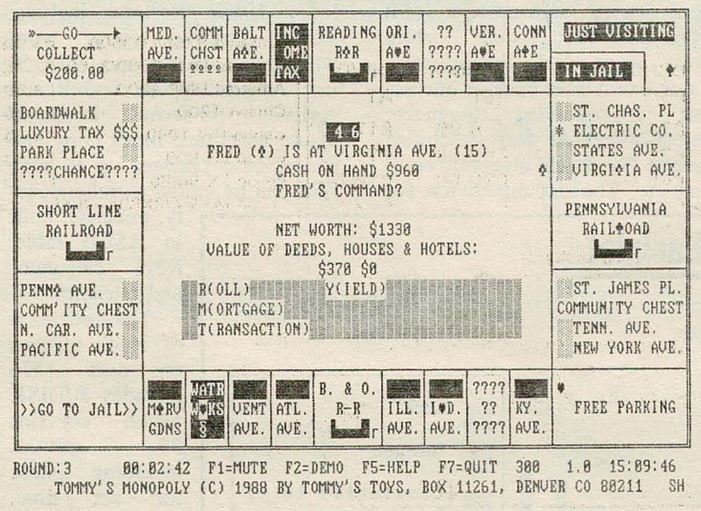
Here's another one for you MIDI buffs. *Sequencer Plus* is on two disks, 1332A and B and is for the control of MIDI music interface systems allowing very elaborate effects to be achieved. Features multi-track record/playback, loops, library facilities, track grouping, global and block editing, special tempo recording track and lots more which will probably mean a lot more to a musician than it does to us. This software is fully functional except that it has no save to disk function and a 2,000 note limit in memory. Also included is *GetIt,* which is a program to handle system-exclusive transfers between your PC and a MIDI device. It can receive files from a variety of MIDI devices and save the data to a disk file, thus allowing a library of MIDI data files to be collected for your devices.

Programming

C & UNIX Tools is a two disk set on 1330A and B and includes many UNIX favourites ported to PC. Items include: *PC-LEX,* the lexical analyser generator with C source; *History v1.4,* command editor with C source; *PCROFF* text formatter (C source only); *PC-VI* editor v1.9a (no source code); *UUencode/UUdecode* with 8086 assembler source; *GETF* – a sort of 'include' facility for C library functions at edit level; *PC-Indent* C program formatter port (no source); *BPlus* B-tree routines (C source); PopUp window routines for Microsoft C 4.0/5.0 with MASM, and programs from *Efficient C* by Plum and Brodie, and from *Reliable Data Structures in C* by Plum.

Continued on page 124

Tommy's Monopoly



Have you seen the streets of Atlantic City? Climb aboard your dog or boot and get into Tommy's Monopoly

Continued from page 123

This is probably one of the most useful collections of its kind around.

A collection of tools including *BTree4,* a Shareware equivalent of Borland's database toolbox, allowing full data and index file management and including enhanced memory storage methods can be found on disk 1372. Also included is *Litcomm,* which allows full interrupt driven buffered comms facilities to COM1. *Pibcat* is a comprehensive disk cataloguing program with full .ARC and .LBR file handling supplied in TP 5 source code. *PXL* is a Turbo Pascal source code lister and cross reference generator. It provides page breaks and headers, options for underline of reserved words, line numbering, matching begin/end pairs; include, $1 files. Complete with source code and customisable reserve word list. *Plasma* is a demonstration of VGA graphics programming, with TP4 source code. *Printpas* is another program which does a fancy printing job on your TP source code.

MAX is a function-oriented procedural language interpreter, complete with integrated environment including editor and debugger. Styled along the lines of Pascal, Modula 2 and C, this language offers many interesting features and possibilities for the adventurous programmer. Includes all expected facilities such as strings, integers, recursion, reals, elemental, internal/external functions, preprocessing. *MAX* is on disk 1353.

Mathematics

Maths SCI Solver on disk 1352 is a program to solve equations from keyed in variables. Functions include: Hyperbolic, exponential, log, answers to 15 sig places, predefined pi and e, degrees and radians. Also on this disk is *Vis Math,* a command line driven maths program which includes functions to calculate decimals to fractions to .1 ppm, factorial up to 1499, prime factors, prime factors of factorials, greatest common divisor and reduction of fractions.

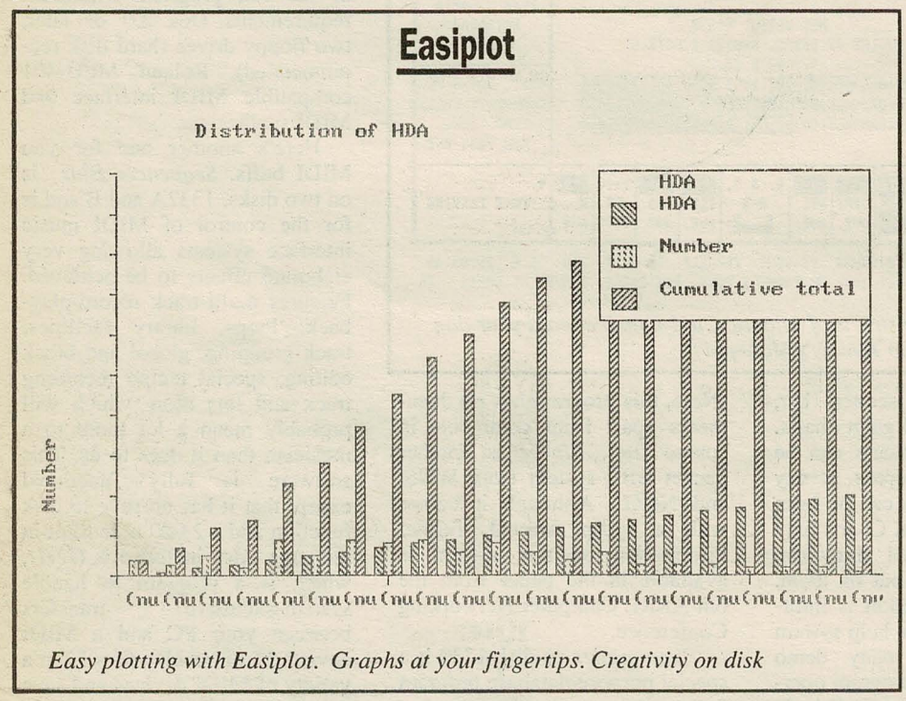
Polymath on disk 1359 is a unique program which combines scientific/engineering plotting, a programming language and a versatile documentation system into a calculator-like environment. It aims to fill the gap between a very powerful programmable scientific calculator and programming in a classical language. It features direct plotting of functions (with autoscaling); plot from data file; visible floating point stack and alphanumeric stack; extendable built-in interactive programming language; object-orientated data structures; reverse Polish and algebraic notation etc. The documentation for *Polymath* is all in the form of an indexed on-screen help system, allowing help on a particular subject to be selected. Support for CGA, EGA, VGA and Hercules displays is provided.

Easistat and *Easiplot* on disks 1354A and B are a pair of statistical analysis programs from a UK author. *Easitat* does the statistical analysis and includes functions such as: mean, mode, median, standard, variance, standard error of mean, chi-squared, Fisher exact, Wilcoxon's rank sum, Kolmogorov-Smirnov, Kendall ran correlation, paired and unpaired t tests, analysis of variance, linear regression with Parsons' correlation coefficient, multiple linear regression and principle component analysis. Spreadsheet type data editor, calculator and table look up functions are also provided. Data input may be from keyboard or ASCII file. With 640k RAM, 70,000 data points can be accommodated. *Easiplot,* the companion program can be used to produce graphic output in the form of bar, scatter and line plots, absolute, cumulative and percentage distributions of the variable in one or two groups, two-way frequency, vertical scatter plots in groups, X-Y plots, multiple X-Y-Z plots. Will work with almost any display type.

Utilities

Softkey on disk 1356 is a full-featured text editor which can edit files up to 450K in size. It is menu-driven from the function keys. Other features include: ASCII graphics entry; word wrap; EGA 43 line and VGA 50 line screen support; search and replace; powerful keyboard macro functions; block copy and move; case change; up to nine files can be edited simultaneously; undelete; built in ASCII table, RPN calculator and calendar.

The collection of batch utilities on disk 1274 includes B/DISK which contains 34 utilities including pause for set time, check file attributes, disable reboot, pause, check time date, check key press etc. *EMSVER* checks EMS and returns errorlevel code if not present. *PRNSTAT E* checks printer status and returns error level code if unavailable or off line. *Xbatch* is another collection of batch utilities including draw box, environment check, search screen for text string, compare files by date and time etc. *Autokey* is a program to allow keystrokes to be faked from within a batch file. *Bigecho* and *Explode* are both programs for producing fancy screen displays with special effects from within batch files. *Daycheck* is a program to set error levels dependent on day, month, hour and year.



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Word and text processing

The *Thor* thought organiser on disk 1328 is a unique creativity/planning aid which allows you to record and categorise your ideas for later retrieval and cross-referencing. It acts like a database, but with full screen text entry for ideas fields. Also good printing options with page headings etc. No accompanying documentation (a manual is supplied on registration) but full context-sensitive help is available within the program, which is menu-driven. Will run on colour or mono systems with Dos 2.0 and 256K RAM.

Idea Tree is a kind of ideas organiser. It uses a hierarchical parent/child structure, with each item assigned an on-screen box with a descriptor of up to 45 characters and which can point to a full screenful of information at request. This provides a very simple method to construct databases. Good copy, move, mark etc facilities are provided so allowing data to be presented in a highly organised and easily understandable manner. You can find *Idea Tree* on disk 1362.

Disk 1366 contains what we believe to be the first thesaurus to be released as PD or Shareware. Ever stuck for words? Want to find an alternative word or just want some help with that crossword? This disk could be your answer. Just type in a word and the program will come up with its nearest match. For example typing in the word 'shun' produced the alternatives 'avoid', 'elude', 'evade' and 'ignore'. One also has the option of following a chain of alternatives from any of the alternatives already displayed. If no match by meaning is found, the program will try the nearest match it can. Some of its choices are pretty bizarre, but words it does know are handled well. This is a standalone program which does not need to be interfaced with any other word processing program. Facilities are also provided to edit the entries for a word. Requires Dos 2.1 or higher, colour or mono display and floppy or hard disk.

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386 SX–26 MHz* VGA TURBO

This product features amazing performance, compact tower, yet no loss of qualities and a wonderfully written user friendly manual. Again, everything you could ever want is standard and included in the price—even VGA and choice of analogue paper white or VGA multiscan colour monitors. This is definitely not a cheap Taiwanese clone, but one of the most advanced systems of its type in the world. An ideal choice for the user who wants high performance, British quality, compatibility and least loss of desk space. The 386 SX will outrun most 386 systems costing twice the price and is capable of running all 386 software as well as Xenix 386, Unix 386 and Windows 386. The huge 65Mb hard disk has 28ms access time and is therefore one of the fastest available, you simply cannot beat this product for performance and sheer value.

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(Computer Shopper. May 1988)
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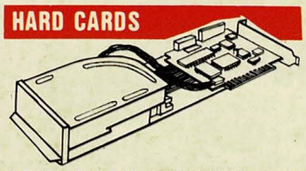

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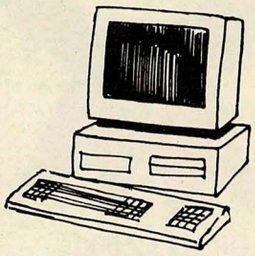

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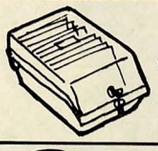

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All done with Miras

by Sid Martin and Timothy Green

Sid and Tim delve into the history of Fortran and reflect on the worth of Mira Fortran for the Spectrum

FORTRAN was the first programming language that looked anything like English. It is even older than Cobol, the vintage business language which we reviewed on the Spectrum Plus Three in February.

The name is a contraction of 'FORmula TRANslation', and the language is aimed at engineers and mathematicians. Now Stephen Lee of Mira Software has implemented a Fortran 77S compiler for older Spectrum variants.

The original *Mira Fortran* was released a couple of years ago, in a 48K cassette-only version that worked, but involved much tape twiddling. The new release comes on cassette, with three demonstration programs and no less than **eleven** different versions of the compiler, for 48K or 128K users with tape, microdrives, Plus D, Disciple or Opus Discovery disks; even Beta disks and Rotronics Wafadrives are supported!

Once you've found the version you want, the Basic loader transfers itself and two code files to your chosen drive. Tape users have to make copies with the SAVE .. CODE command, using numbers from the printed manual.

Ancient programs

Fortran dates from 1957, when it was developed in a rather ad-hoc way to suit the IBM 704 computer. It was soon converted to run on other computers, as mathematicians and scientists realised that they could write their own programs in this symbolic language, rather than entrust their formulae to specialist programmers who would laboriously boil up new nonsense for each computer.

Nowadays the language is much enhanced and still in common use. Basic can be regarded as an interpreted version of an early version, Fortran II. Fortran IV was the first American National Standard programming language. Then came Fortran 77, the most common version in use today. Mira has implemented a sub-set of this, Fortran 77S.

Fortran is compiled, and hence faster than languages like Basic, where the **source** – or English-like program – is usually interpreted as each line and symbol is encountered. Mira Fortran does all this analysis at one go, and cannot run the program until it has all been translated into Z80 machine code.

Interpreters allow fast program development, as you can try out changes very quickly. Compilers run finished programs faster, particularly when the operations being performed are simple – like arithmetic using whole numbers. Mira Fortran can count its way through 25,000 loops a second, whereas the interpreter can only manage about 240.

The speed-up factor is less impressive when floating-point arithmetic is used. A loop containing floating-point addition, subtraction, multiplication and division performs 182 iterations a second in Mira Fortran, whereas ZX Basic can crunch the same values 56 times a second.

Mira Fortran uses Sinclair's ROM maths package to do the calculations, like ZX Basic, but it is still faster because it does not have to check and translate each line. The benefit is even greater for larger programs, as ZX Basic slows down markedly as program size increases – unlike compiled languages.

However the speed-up depends entirely on what you want to do. Graphics and trigonometry may not be much faster in a compiled language, because the time taken to interpret such instructions is usually less than the time needed to work out the result on a Z80 processor.

Mira Fortran editor 'Help'

```
Editing keys Help screen

UP              Cursor up one line
DOWN            Cursor down one line
7/6             Up/Down 8 lines
SShift 7/6      Start/End of program
E               Enter 1 line
ENTER           Line entry mode
EDIT            Edit current line
B               Mark start of block
K               Cut Block
P               Paste block
DELETE          Delete block
V               LLIST Block/program
O               Enter options byte
F               Find string
N               Next occurence
S               Save program
L               Load program
C               Catalogue
X               Start Compilation

Press Required Key
```

The editor works much like the one in 48K Basic, with the addition of a range of single-keystroke commands

The Editor

The Fortran editor uses normal Spectrum display and keyboard routines, with 32 characters per line on the screen, caps-lock, auto-repeat and key-click. The editor works much like the one in 48K Basic, with the addition of a range of single-keystroke commands.

The arrow keys move a cursor up and down the left edge of the screen, alongside the program text. You press EDIT to pull the current line to the bottom of the screen, where you can move another cursor inside it, making additions or deletions.

The whole screen is re-drawn every time the first cursor moves from line to line, so it's just as well that keys 6 and 7 (the unshifted arrows) jump the cursor up or down eight lines at a time; Symbol Shift lets you move directly to the start or end of the program.

Press **Enter** to insert text after the current line. This is easy to do by accident, and leaves you entering lines until you press the down-arrow to return to the single-keystroke commands. **E** inserts a single line above the current one.

H calls up a list of editor commands, shown in the figure 'Mira Fortran Editor 'Help''. **F** searches the program for a particular word, from the start. You can move, delete or copy blocks of text, but you can't save them. Load does not get rid of the current text – it just adds more, allowing you to merge files.

Program layout

Fortran programs were originally written on 80-column punched cards, in a rigid format, with numeric line labels in the first five columns and the program in columns 7 to 80. You could not find a typing mistake or a misplaced card without compiling the whole program.

Mira Fortran is much better. Like ZX Basic, it checks the syntax of each line as it is entered, and displays a question mark by anything it can't understand. As in Basic, some errors – like missing declarations – cannot be detected until you compile the whole program, but even so the syntax checker saves a lot of time.

The screen editor keeps lines in sequence for you, although the order of line labels is up to you. The compiler ignores spaces in the main part of the line.

Statements can span more than one line, as in Cobol. A + sign in column 6 indicates that a line is a continuation of the one before.

Fortran allows 'Debug' lines, which start with a letter D and are ignored unless you select a special option before compiling. Debug lines can do anything, but they are usually PRINT statements which tell you what the code is up to. Once a program works you can disable the test code and re-compile. The debug lines are still in the source if you need them later.

The built-in editor is versatile and easy to use, but it lacks some of the features of a dedicated text editor. However the file-format is standard ASCII (with optional line-feeds) so you can use other editors.

The microdrive and Opus Discovery versions store Fortran in sequential files which you can edit with *Tasword 3* or later releases. The Plus D and Disciple versions use CODE files which load happily into Cardex's *Word-Master*. Trojan's *The Last Word* should also be suitable, but we could not check this as we only have the Plus Three version.

You can keep Fortran source

Continued on page 130

Continued from page 129

on disk or tape, or in the RAM disk of a 128K Spectrum. The file 'COPY SOURCE' is automatically loaded if it exists when the editor starts up.

Disk and cartridge versions have a 'Catalogue' command to show you what's already in the drive, but there's no way to erase files from inside the program, and no quick route to Basic.

The Plus D version crashes if you try to save a file to disk under a name that's already been used, forcing you to re-load the editor and your program. Plus D file-names can be typed in upper or lower case, but cassette names must be entered exactly as they were typed.

The language

Fortran is an old language, but it's not short of features, even in Mira's trimmed '77S' variant. It supports simple block-structure, with IF..THEN..ELSE that can span several lines. The DO loop works rather like FOR in Basic, but you have to use GOTO and numeric line labels to set up other types of loop. Yuck.

You can pass parameters into and out of independent blocks of code, called Functions or Subroutines – another name for Procedures. Parameters are not checked to make sure there are enough, and types match. This is often very convenient but causes many bugs.

Fortran statements are written ENTIRELY IN CAPITALS, though you can use small letters in comments. Names are limited to six alphanumeric characters, which is rather restrictive, but standard Fortran.

Mira Fortran can handle four data-types: integers (whole numbers +/- 32767), 'reals' (decimals of up to nine digits), characters and 'logical' values (.TRUE. or .FALSE.). You can dimension arrays of any type.

Mathematicians and physicists may be disappointed that Fortran 77S doesn't allow **complex** variables. These have a special two-dimensional data-type, rarely found outside big Fortran systems.

Fortran excels at number-crunching. Mira Fortran lets you write calculations much as in Basic, with brackets and the usual four operators, plus ** to raise a number to a power. There are 39 built-in maths functions, including all the ZX Basic ones plus extras for hyperbolic trigonometry, remainders (MOD), highest or lowest values from an arbitrary list, and other arithmetic goodies.

Integers occupy two bytes of memory, whereas reals take five. Integer arithmetic is the default in Fortran – you must put a decimal point in numbers if you want a decimal result, even if the value has no decimal part. Logical variables take a minimum of one byte, but Mira Fortran can pack eight logical array elements into each byte.

Characters occupy one byte each. Mira Fortran does not support character functions, substrings or concatenation, unless you manipulate characters individually, or resort to tricks like EQUIVALENCE, which lets you use the same area of memory for several variables, regardless of type.

File-handling is impressive in view of the wide range of add-ons supported. Fortran programs have access to channels #1 to #15, which you can OPEN to any device from ZX Basic before calling the compiled code.

Mira Fortran

```
C Computer Shopper FORTRAN 77S
C test based on Mira Software's
C PRIMES demo, slightly edited
C with Cardex's WORD-MASTER WP
C
      PROGRAM PRIMES
      N=2
      PRINT 30,N
      DO 20 N=3,10000,2
>       IF (PTEST(N)) PRINT 40,N
20    CONTINUE
30    FORMAT ('Primes:',C6,I3)
40    FORMAT (C6,I3)
      END
C
      LOGICAL FUNCTION PTEST(J)
      PTEST=.FALSE.
      DO 10 I=3,SQRT(J),2
      IF (MOD(J,I).EQ.0) RETURN
10    CONTINUE
      PTEST=.TRUE.
      END

Press Required Key
```

Mira Fortran 77 screen editor display

Normally #1 is the lower screen and keyboard, #2 the main screen, and #3 the printer. Higher channel numbers can refer to disk or cartridge files, the network, or other stream devices you may own.

Filing is thus very flexible, but sluggish because it goes through the Spectrum's streams, which work one character at a time. You can read and write any type of variable in packed binary or in a range of formatted styles, rather like PRINT..USING in Basic.

There are three limitations: random-access files are not allowed, and you can't output strings or calculations unless you store the value in a variable first. You can detect the end of a file, as long as it is formatted in lines, but other transput errors stop the program.

It did not seem posssible to continue display output on one line with several PRINT or WRITE statements. Each one took a new line.

Unusually for a Fortran compiler, graphics are supported, through built-in PLOT, DRAW, ARC and CIRCLE subroutines. These use the Spectrum ROM so they work like ZX Basic, though a bit faster. You have to use control codes to set the ink, paper and cursor position, but this is easy enough.

Mira Fortran supports a single-channel BEEP command, as in ZX Basic, but there's no PLAY for chords. IN and OUT are also missing, making it hard to control the Spectrum 128 sound-chip directly. PEEK and POKE are absent, but no true Fortran programmer will miss them – it's not the sort of thing you do in Fortran.

Low-level access to the hardware is possible if you don't mind writing some machine-code. A built-in USR subroutine calls code at a specified address. You can't nominate parameters to be passed from Fortran, but there's no reason why the code should not access the 'COMMON' area of memory where Fortran keeps its variables, as long as you patch the address into your code after compiling.

Compiling

The editor and syntax checker occupy about 10K of memory, leaving room for perhaps 1,000 lines of source. Mira Fortran can only compile from RAM – not to or from disk – but it uses overlays to get the most out of the Spectrum's main memory.

Once syntax has been checked, disk and cartridge versions of Mira Fortran save the source in the file 'COPY SOURCE', in case you forgot to save it yourself. Then the code generator loads over the top of the editor. Screen memory holds temporary data, so strange patterns appear as the compiler runs.

If all goes well Mira Fortran prints four numbers, telling you the address to CLEAR to protect the compiled code, the start address and length to SAVE, and the address of variables in the program's COMMON area. The machine resets as soon as you press a key, leaving the compiled Fortran at the top of memory.

This is what we saw when we compiled *LSFIT*, a 3K demo program that reads a file of numbers, plots them, and works out the 'best straight line' through them:

```
CLEAR 55026
SAVE 56238
LEN 9130
REM 56208
```

If an error is found, a report appears, documented in rather technical terms in the manual. The editor displays the offending line, with a flashing cursor to mark the place where the error was noticed. You must change the source code and try again.

The demo programs compiled fine, but we found a few apparent bugs when we tried tweaking them.

Illogical, Captain!

The code generator locked up when we added a .NOT. operator before the call to the logical function in PRIMES. We got a spurious 'array syntax error' when we tried to make a WRITE conditional on a logical IF. Both problems went away when we used a block IF instead of the single-line logical IF – but the .NOT. always returned .TRUE.!

Unary .NOT. seemed to be off the menu, so we decided to try a logical comparator instead. We were unable to get the logical operators .EQV. and .NEQV. past the syntax checker, although they're in the manual.

Luckily .EQ. and .NE. worked fine when comparing logical values, even though the manual says that they are intended to compare 'arithmetical or character expressions.' So (.NOT.(FTEST(N))) became ((.FALSE.).EQ.(FTEST(N))) and all was hunky dory. Curiously, ((.TRUE.).NE.(FTEST(N))) was rejected, with or without the 'QV'.

The compiler didn't seem to like implicit logical values. We tried:

```
IMPLICIT LOGICAL (F)
FALSE=.FALSE.
```

and got the report 'Wrong data type' for our pains. It worked fine if we replaced the IMPLICIT declaration with an explicit LOGICAL FALSE – but complained if we used both at once. Mira Fortran can be made to work, but it takes a while to find your way around its quirks.

Compilation is quite fast, in view of the amount of disk loading and saving to be done. It took a total of five seconds to save the source of the minimum program – one line, END – on a 780K Plus D disk, load the code generator, and compile the program. The resultant file was a little under 5K long; this indicates the 'overhead' involved in compiling any program, regardless of size.

The 3K, 120 line *LSFIT* program compiled in about 17 seconds, including the time taken to create the COPY SOURCE backup file and load the code generator. Compilation is faster if your program has a mistake in it, as most of the checking is done before the drive is needed. It took five seconds for Mira Fortran to find and reject a deliberate mistake at the end of *LSFIT*. You run compiled Fortran by entering RANDOMIZE USR 63500 from Basic, with the code above RAMTOP. A message appears if an error crops up while the program runs. You must guess where the error occurred, re-load, edit, compile and re-run till the bug vanishes.

This can be a long-winded business, and may be unbearable if you rely on tape storage.

Short story

The manual is neat and contains lots of interesting information, but it is too short, at just 16 A5 pages. The first five pages document all the versions and the editor, followed by eight pages discussing the implementation, and two pages explaining the error messages. The last page tells you about the demo programs and gives Mira Software's address, but no phone number. You can do quite a lot with the information suppplied, and a little experimentation with the demos.

Besides *LSFIT*, Mira Fortran comes with a tiny demonstration program to find prime numbers, and FUNCT, a package of three subroutines which plots the graph of a function, integrates it, and attempts to solve it for F(X)=0. All good stuff, as long as you like maths.

Much the same could be said of Fortran, although it's also of interest to keen hackers and students of programming. We feel that Mira has taken on rather a big job in supporting 11 different versions of the compiler, and it seems that the *Plus D* version could do with some extra testing.

That said, it's good to find serious software for Beta and Wafadrive users, as well as the popular Opus, +D, Disciple and Microdrive versions. The support for the Spectrum 128's RAM disk is also gratifying. In fact it's rather surprising that there's no Plus 3 version, but Mira Software had to stop somewhere and Amstrad did Mira no favours when it failed to implement disk streams in +3 Basic.

At £15, Mira Fortran is quite good value if you're interested in programming, although we found the bugs and brief documentation a bit frustrating.

Microdrive speedup

We've been contacted by a Mr Turney following our advice on microdrive tweaks in the March issue, when we explained how to adjust the speed of QL drive motors. Mr Turney has tried souping up two Spectrum drives, and averages a 12 per cent increase in the capacity of each cartridge – so it seems our advice for QL owners is just as relevant to Spectrum microdrivers.

Fastword update

Bruce Publishing has written to follow up our "fair and constructive" review of *Fastword* in the April issue. The company went on to comment: "not surprisingly, *Fastword* is being compared with its printed counterpart with regard to speed of use and price.

"Whereas it appears to be winning on the speed side, especially for more than one word or when loaded from disk, it seems to be classed as a little overpriced. With these thoughts in mind we have decided to reduce the price by £5 to £7.95 (inclusive), which we hope will make it more competitive."

Next month

We've a backlog of letters from readers, many of which will be answered in next month's *Sinclair Scene*. By the time you read this we'll have written our replies, so don't be put off getting in touch.

If you've anything interesting to tell *Shopper* readers, please write to us at the usual address, marking your envelope *Sinclair Scene*.

Contact

Mira Fortran: Mira Software, 24 Home Close, Kibworth, Leicestershire LE8 0JT.

Fastword: Bruce Publishing, 72A Lawe Road, South Shields, Tyne and Wear NE33 2AJ.

Sid Martin and Timothy Green deny the accusation that they are the self-styled Bing Crosby and Bob Hope of the razza-matazz world of Sinclair

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Money matters

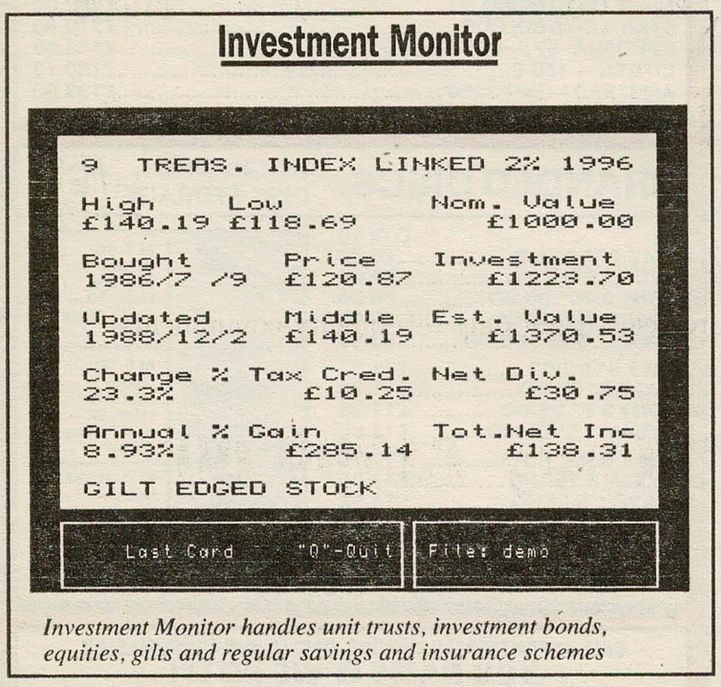
by Sid Martin and Timothy Green

Sid and Tim check out capitalist accessories this month, with a review of Michael Slatford's Investment Monitor for the QL

INVESTMENT Monitor is a program that helps you keep track of Stock Market holdings. It handles unit trusts, investment bonds, equities, gilts and regular savings and insurance schemes. You can compare the performance of your investments with that of funds on deposit, say, in a building society, and transfer figures back and forth between the two accounts.

The program runs on the Spectrum, from cassette or microdrive, or on the QL, with special versions for disk users and those with expanded memory. In this review we'll look at the latest all-singing, all-dancing QL disk version 3.08 – but most of the features are shared between them all, and we'll draw attention to those documented as machine-specific.

The program works with 'cards' for each investment, clearly displayed one at a time on the screen. Besides ordinary shares and gilts, it can handle regular periodic investments, like insurance and saving schemes; you can also enter investment bonds, with or without withdrawals, and three kinds of unit trust – accumulation, income and re-investment units.



Investment Monitor handles unit trusts, investment bonds, equities, gilts and regular savings and insurance schemes

Getting started

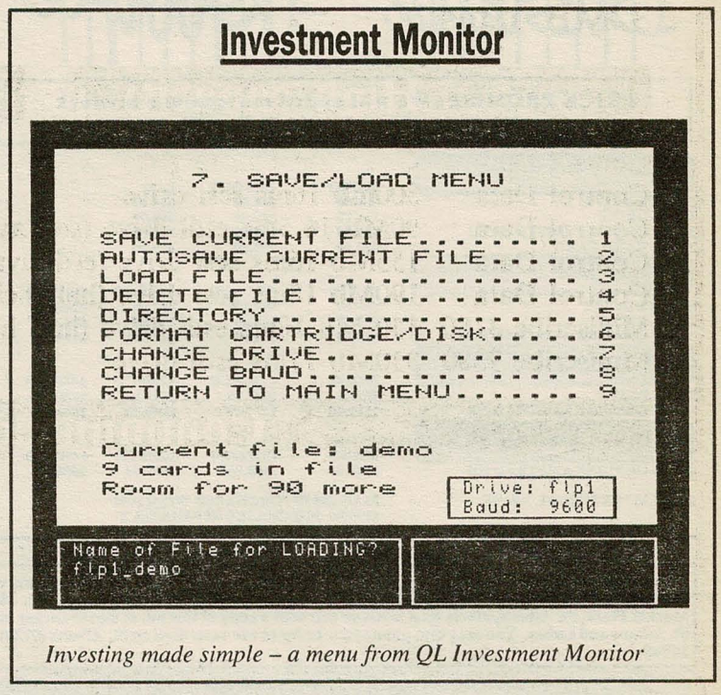
To get started you must enter the name of the investment, the date of the contract, quantity, old price, and today's price and date; curiously the program does not read the system clock for you. Dates are validated, so you can't enter nonsense like February 29th 1989, or anything before 1950 or after 2050. You type the year, then the month and day number, presumably to keep comparisons simple by putting the most significant number first.

Once you've entered this information the program fills in the other boxes on the card, showing the latest realisation, percentage change, tax credit and net dividend. Later you can review the data and change any entry on any card. If you want the portfolio to appear in a different order the program lets you renumber the cards.

Up and running

Investment Monitor keeps running totals for each financial year. Menu options let you sell all or part of a holding, and updates prices to check the new size of your stash. If you change your portfolio, *Investment Monitor* can distinguish old and new money, so you can tell profits from extra funds pumped in.

The Analysis menu shows the highest and lowest points you have recorded, how long you've held an investment, the value, percentage growth, total and annual profit or loss. The menus are controlled by pressing digit keys, but other information is input into windows in the normal way. You can get back to the main menu by choosing a menu option, or entering 'mm' at any other time.



Investing made simple – a menu from QL Investment Monitor

Investment Monitor factors-in the cost of dealing, allowing 1.5 per cent for shares, or 1 per cent for gilts, with a minimum fee of £20 or £12 respectively. You can type in the quoted price of Gilts as a fraction, as it is printed in newspapers, by putting a plus sign between the amount in pence and the fraction – for instance 95+9/16 means the same thing as 96.5625.

Capacity

The program copes with a maximum of 50 investment cards in one file, or 99 on expanded QLs. If you buy the same shares on several occasions you may wish to enter each as a separate investment, for a precise breakdown of earnings. The snag is that this uses up cards and makes updating a chore.

The publisher recommends that you stick to one card per investment, and adjust the starting price to reflect the average price paid per share. Scrip issues should always be handled by editing the corresponding card, as a price of £0.00 baffles the program, quite understandably.

You can save files of cards on microdrive, RAM disk, floppies or hard disks. The supplied 'clone' utility will make back-ups of the program onto any QL device. The Spectrum version will save to tape or microdrive – it should also save and run from Opus Discovery, Disciple and Plus D, as they use microdrive BASIC file-handling commands.

A conversion program lets you load data files from earlier versions of *Investment Monitor*, and Michael Slatford supplies a demo file so neophytes can make their mistakes on un-important data.

Annual reports

Investment Monitor can print out neat investment reports, for all or part of your portfolio. The report shows the amount you bought, the old and new value, income and percentage growth.

Performance figures are calculated and shown on an 'offer to bid' basis. It also predicts the amount Gilts will earn and realise, and shows your capital gain or loss. Losses are preceeded by a minus sign rather than shown in brackets, accountant-style.

The amount invested, capital gain and income are totalled at the bottom of the report. The adding up seemed correct, but we can't vouch for the computation, as we're microholics rather than stockbroking types. The User Guide contains the usual 'Every effort but no responsibility' disclaimer, but Michael Slatford has been sellling this package at Microfairs for long enough to prove that people find the program useful.

The program prints an income summary for tax purposes, showing Gross and Net dividends and

Continued on page 135

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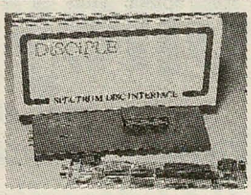

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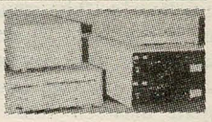

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Continued from page 133

Tax Credits for each investment so far in the year, with totals for your accountant.

The Spectrum and standard QL versions require a printer with an Epson-style 'condensed mode' capable of 137 printed columns. Most full-width dot-matrix printers will fit the bill. There's a special QL version for people with A4-width daisywheel printers, teletypes, and other devices that can't manage more than 80 columns.

QL *Investment Monitor* writes to SER1, with line-feeds. You can configure the character code used for pound signs, but it must be a single character; escape sequences are not allowed.

QL variations

The QL version includes a 'stop-loss' indicator, which prints prices in red for emphasis if your investment value has fallen by more than a certain percentage – the default is 10 per cent, but you can set any value – even 104 per cent, if you're determined to be silly. Automated warnings can be a good idea – but if everybody uses one, the bottom may drop out of the market rather suddenly if everyone's computer hoots and they all try to sell at once.

US automated trading programs got a lot of the blame for causing the most recent Stock Market crash, by off-loading stock at distress prices when things started to look shaky. The QL *Investment Monitor* is a bit less de-stabilising, as it lets you pick the point at which it gets worried, and only displays a warning if prices drop below the chosen threshold. It's up to you to decide what to do with the information. Sell! Sell! Jump!

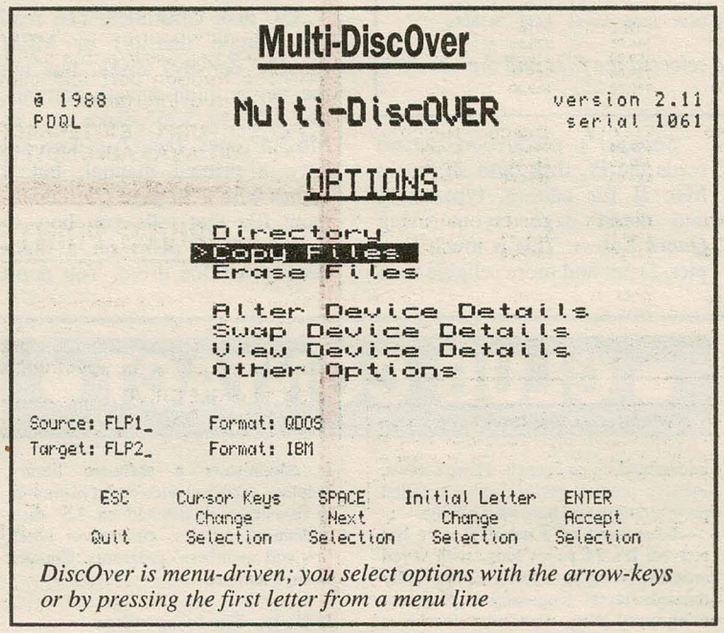
The new QL version 3.08 lets you offset past losses against Capital Gains Tax, factors in your allowance, and can set past gains and losses against changes in the Retail Price Index.

An extra slip of paper summarises monthly index values since March 1982; it's up to you to enter these into the program as required. This usually means waiting a while after trading, because the index is published a few weeks in arrears. Luckily, tax inspectors move even more slowly, so the delay doesn't matter as long as you remember to do it before you die.

Another feature unique to the expanded QL version lets you turn off the normal Sterling currency display, so you're not forced to read displays and printouts in pounds and pence as you shuffle through your notional stash of dollars or Altairian ningies. You are still not allowed to mix different types of currency in one file.

The QL disk includes several tasks with differing drive defaults. You can save, load, delete or replace files on any device, format a drive or read a scrolling directory, all from inside the program, but you can't save your preferences. You can set the serial port speed to suit your printer, but not the printer device name – so you can't print to a file, for later transfer to another program or computer.

The QL program runs as a task, compiled with *Q-Liberator*, but the menus are controlled by entering single digits, with no need to press Enter and no cursor on the screen. This is convenient if you're only running one task, but it stops you multi-tasking consistently unless you've got a front-end program like *QRAM* or QL World's tiny *Taskforce* freebie. The displays are clear, even on a colour TV.



DiscOver is menu-driven; you select options with the arrow-keys or by pressing the first letter from a menu line

The User Guide is paperback-sized and consists of 15 clearly-printed but packed pages, plus a document file on the disk, explaining recent improvements. The most important points are printed in little boxes in the text, for emphasis. The layout is neat, with proportionally-spaced text, but looks dull because all the lettering is one size, and one weight.

This appearance belies the style of the manual, which is informal but clear, with only the occasional attempt to re-classify bugs as features. It's a lot easier to understand than most accounting guides, but there's quite a lot to read.

Michael Slatford has strong views about automated trading. In the introduction to the User Guide he writes, "my firm belief is that buying or selling decisions can only be made by people, and that past performance is not necessarily a guide to the future... no computer can possibly take into account all the factors that lead to market fluctuations."

The verdict

Investment Monitor is not designed to make decisions for you, but to ease recording and analysing the performance of your investments. It is intended to give you extra time and information, when you need to make decisions. It's useless unless you take the trouble to type things into it regularly, and check your work, but it makes the job relatively painless and interesting.

Investment Monitor does a useful and consistent job for the small investor. It can take some of the guesswork out of investing, which may make things more or less fun depending on your own attitude.

Most people will appreciate the way it helps with tax planning, reducing stress and hopefully saving money into the bargain. You'd still be wise to consult a professional accountant before submitting your accounts – unless you're in touch with the latest tax-gathering fashions – but even then *Investment Monitor* may save you money by reducing the amount of boring, non-creative work your accountant needs to perform.

The *QL Investment Monitor* costs £20 on microdrive cartridge, or £22 for a range of different versions on 3.5" 1440 sector disk. The Spectrum version costs £12 on cassette, or £14 on cartridge. It's fast, tolerant and easy to use; recommended if you've got a portfolio, or want to know how much you might earn if you had some money to start with.

New releases

QL Adventurer's Forum has expanded its library of Public Domain QL software on disk and microdrive cartridge. The range now includes simple arcade games, adventure-writing tools, graphics demonstrations and utilities. It also has 20 disks of Public Domain adventures for the IBM PC.

Two new QL adventure games are in the works: *Dreamlands*, a compiled text adventure for users with at least 384K of memory, and *MacSporran's Lament*, a graphic adventure for any QL, written using *ACT*, the Adventure Creation Tool.

CGH has picked up the UK rights to Oliver Neef's games, previously only available in Germany. *The Final Conflict*, *The Open Golf*, *Grey Wolf* and *Return to Eden* will be released later this year, when translation and testing is complete. The next game from Alan Pemberton will be called *Beano*, but there's no date for release yet.

The latest QLAF pricing scheme is so Byzantine in its complexity that we shall not attempt to explain it here; please write directly to CGH for price information. Most of the titles mentioned here cost a tenner or less, depending on where you live, how you pay, the drives you use and whether you send media.

Incidentally, there's an even newer version of *D-Day*, CGH's souped-up variant of the Games Workshop wargame. Earlier versions had a bug which make it incompatible with some QL set-ups, although they worked fine on others. A free upgrade is available to anyone who bought *D-Day* from CGH Services and got a version before number 1.33. Send the master disk or cartridge 1, with a 14p stamp, to get your upgrade.

Multi-DiscOver

The QL can do lots of wonderful things, but sometimes it needs to talk to less capable computers. PDQL's *Multi-DiscOver* is an efficient way to transfer data to other machines, with none of the speed or functional penalties associated with PC or CP/M emulation. If you've noticed an improvement in the typesetting of Sinclair Scene since the first issue of *Shopper*, *Multi-DiscOver* may have something to do with it.

Our first columns were written on a variety of computers and submitted on paper, to be retyped by some poor wretch each month. Now all the mistakes are our own – plus a few bounced characters from Schoen's replacement QL keyboard, which gives us a choice between serial port bugs and bouncing keys, at least until Schoen comes up with a modified second processor.

Sinclair Scene is written on the QL and Thor, using Psion's *Quill* and *Xchange*; then the text is sent to *Shopper*'s offices on a 720K MsDos disk, formatted on an Amstrad PPC. We use a spe-

Continued on page 136

Continued from page 135

Multi-DiscOver

Copy Files

```
 88596 MULTI                    Dir RW      1989 Jan 17 13:00:15
     0   DOCUMENTATION          Dir RW      1989 Jan 17 13:00:15
 54854 DISCOVER_DOC             Dir RW      1989 Jan 17 13:00:30
  2357 NOTES_DOC                Dir RW      1989 Jan 17 13:00:33
     0   IBM DEFINITION FILES   Dir RW      1989 Jan 17 13:00:34
   301 APRICOT_315K_DEF         Dir RW      1989 Jan 17 13:00:36
   302 APRICOT_630K_DEF         Dir RW      1989 Jan 17 13:00:38
   302 APRICOT_720K_DEF         Dir RW      1989 Jan 17 13:00:39
   300 IBM_160K_DEF             Dir RW      1989 Jan 17 13:00:41
   301 IBM_320K_DEF             Dir RW      1989 Jan 17 13:00:42
     0   CPM DEFINITION FILES   Dir RW      1989 Jan 17 13:00:43
   409 EPSON_QX10_CPM           Dir RW      1989 Jan 17 13:00:45
   405 ICL_DRS20_CPM            Dir RW      1989 Jan 17 13:00:46
   403 ICL_DRS300_CPM           Dir RW      1989 Jan 17 13:00:48
   404 ICL_PC1_CPM              Dir RW      1989 Jan 17 13:00:49
   404 ICL_PC2_CPM              Dir RW      1989 Jan 17 13:00:51
 FLP1_   QDOS    Total: 737280   Free: 354816

ESC  (CTRL)+↓ SHIFT+key  TAB    F1      F2     F3   F4    F5    ENTER
      (page)    Disable  ------ Select ----- Name New Dir View  Action
 Quit  Scroll           File Directory Disk  Mode Level File  Selects
```

Copying is automatic once you've selected the files and the destination drive and directory

cial print driver to send the text to a file, with bold and italic type marked with words rather than control codes, then copy the file from RAMdisk to PC format with *Multi-DiscOver*.

Shopper's production person reads the PC disk onto an Apple Mac II for editing, typesetting and direct page layout using *Quark Xpress*. This is much simpler, faster and more reliable than messing around with modems or serial leads. The only thing we have to ensure is a steady supply of empty PPC disks, as *DiscOver* won't format disks for us.

DiscOver can read and write lots of different disk formats: Atari STs, PCs, Apricots, BBCs, Unix machines and many CP/M formats, including Amstrad PCW and Plus Three disks. The most annoying omission is the lack of an Amiga option; Amiga disks use a weird single-sector track format that gives 880K on a normal MFM 80 track disk.

QL disk controllers can read FM (single density) or MFM (double density) disks, but not the newer high-density formats, like 1.2 Mb 5.25" disks or 1.44 Mb 3.5" ones. *DiscOver* does not have a printed manual, but it comes with a 30 page *Quill* document file that tells you how to format MFM disks on a high-density MsDos drive. You don't miss the manual for long, as *DiscOver* is quite easy to use.

Voyage of DiscOvery

DiscOver is menu-driven; you select options with the arrowkeys or by pressing the first letter from a menu line. It works with two drives at a time, termed 'Source' and 'Target'. These can be QL or other formats, but you can't go from one CP/M format to another, or put more than one format in a single drive.

There's no option for single-drive users to swap back and forth, but it's invariably quicker to go via RAMdisk in any case. If you've got one disk drive, and no RAM disk software, it may be time to dust off those micro-drives...

The main menu lets you set the format of Source and Target, swap them, read a disk directory, copy or erase files. The directory display lets you hop up and down through sub-directories, view the

● CLUB CONTACT ●

Every month this part of *Sinclair Scene* is updated. It lists the better Spectrum, QL and Z88 user groups, with contact names and addresses. This month's column also includes reviews of the latest newsletters.

These clubs charge a membership fee of a few pounds a year, normally entitling you to telephone advice, a regular journal and access to a software library. The groups have members all over the world; they can tell you useful things you'd be unlikely to find out any other way. Send a stamped addressed envelope to the address shown to find out more about groups that interest you.

If you are in a group that you think we should be listing please ask the organisers to put *Computer Shopper* on their mailing list. We've heard rumours of a number of interesting QL groups overseas, like *Quasar* and the *QL Professional User Club* (Germany), *QL Swenska* (Sweden), *QLUB Norway, QITALY, QL CLEF* and *QL Schweiz* (Switzerland), *QL Limberg* (Belgium), and *QL DOC* of Montreal, Canada.

We're keen to hear more about these groups, and others that may have come to your attention. *Shopper* can be a nexus for hundreds of thousands of Sinclair users all over the world. We've decided to stop mentioning the Spanish group, Q-LAVE, for the time being, as we have not heard from it for over a year, and we have had no reply to a letter asking for news. Hopefully it will re-surface soon.

We've recently received a compilation disk and newsletter from *QL Contact France*, which we first mentioned last month. The software is plentiful, interesting, and well-presented, while the newsletter is the best we've ever seen.

Informa consists of 64 A4 pages with a card cover. It is produced with Quill and a 24-pin Epson LQ-500 printer – apart from a review of *Text 87*, which produced itself. Headlines – the weakest part of the layout – were printed with *Sign Designer* and *Text 87*. The magazine is packed with interesting information, even if you don't understand much French. There's news, incisive product reviews, plus detailed programming and hardware advice.

Issue zero of *Fractal Report* has arrived; it's 24 pages long, with seven articles ranging from philosophy through fractal geography to programming nitty-gritty. Particular machines mentioned include PCs, Spectrums, QLs and Macs, but it's easy to convert the short examples to run on other machines. If numbers, computers or graphics fascinate you, so will *Fractal Report*.

The Spectrum disk users' magazine *Format* has broadened its scope to cover most serious Spectrum applications. The 32-page April issue includes news, a review of *TasCalc*, an interesting and original history of 'adventure' games, several short listings, and programming articles on GDos, Basic protection and Hisoft C. The main listing is *FastFile*, a concise memory-resident database with a machine-code search facility.

The latest *Z88 EPROM* magazine runs to 36 pages, with reviews of a Z88-ST link, the new BBC Basic manual, and Z-TAPE, a cassette interface. Articles discuss directory structure and the format of ROM cartridges, and there's even a Z88-related crossword!

RAMPACK II – Spectrum Music Machine Club
Chesters, Chesters Lane, High Bentham, Via Lancaster LA2 7AN.
A club for Spectrum users interested in music, covering most popular interfaces. The newsletter deals with technique, MIDI programming and reviews. RAMPACK II also distributes software and sampled sounds. Contact: Sean Sanderson.

Spectrum Discovery Club
57 St Saviour's Road, West Croydon, Surrey CR0 2XE.
A non profit-making, independent club for users of the *Opus Discovery* Spectrum disk interface. The Discovery Club has over 500 members worldwide. It administers a software library, helpline, repair service and a bi-monthly newsletter distributed on 3.5" disk, containing articles, conversion notes, tips and members' programs. Contact: Brian Mumford.

INDUG – The Independent Plus D/Disciple User Group
34 Bourton Road, Gloucester GL4 0LE.
A fast-growing group for 'serious' Spectrum users, with about 1,400 members. The group magazine, *Format*, includes regular coverage of Miles Gordon Technology gadgets like the SAM computer, Plus D and Disciple disk systems, plus general news, reviews, reports and programming articles. Services include an excellent monthly magazine, GDos fixes and enhancements, telephone help, and discount on MGT products. Contact: Bob Brenchley.

BetaBasic Newsletter
24 Wyche Avenue, Kings Heath, Birmingham B14 6LQ.
A newsletter for users of Spectrum BetaBasic – an expressive, block-structured extension to Sinclair's ZX Basic. BetaBasic routines are at the core of the Basic interpreter in the forthcoming SAM computer. Contact: Andy Wright.

Z88 User's Club
68 Wellington Street, Long Eaton, Nottingham NG10 4NG.
An independent club for Cambridge Computer Z88 users, which offers a bi-monthly club magazine, software library, reviews, discounts and information. Over 1,000 members. Contact: Roy Woodward.

Fractal Report
Reeves Telecommunications Laboratories, West Towan House, Porthtowan, Truro, Cornwall TR4 8AX.
This newsletter investigates 'fractals' like the Mandlebrot Set – simple mathematical models that produce unexpectedly complex and interesting results. It is aimed at all interested programmers, regardless of computer, and hopes to cover fractal poetry, sculpture and music, as well as colour graphics. Contact: John De Rivaz.

QL CONTACT FRANCE – The French QL User Group
38-40 Rue Stephenson, 75018 Paris, France.
Roughly 300 French-speaking QL users who publish *Informa*, a heavyweight quarterly bulletin, and Public Domain software on disk and microdrive cartridge. The group also offers telephone help with software and hardware problems, and on-line communication through packet radio and Minitel, the French equivalent of Prestel.

QUANTA – The Independent QL/Thor User Group
15 Grosvenor Crescent, Grimsby, South Humberside DN32 0JQ.
A long-established QL and Thor support group, with around 1,600 members. Quanta runs local, national and international meetings, and administers a varied library of hundreds of programs, mostly free to members. The group also offers telephone help and a 32-40 page monthly newsletter. Contact: Phil Borman.

QL Super User Bureau
PO Box 3, Shildon DL4 2LW.
QL SUB is a commercial support group for users of the Sinclair QL, CST Thor, ICL One Per Desk and BT Tonto. Members number over 850, and receive an irregular newsletter, discounts and written and telephone help, during office hours and until 7pm, Monday to Thursday.

QL SUB also runs a round-the-clock viewdata bulletin board on (0388) 773737. Contact: Richard Turner.

QLAF – The QL Adventurer's Forum
Cwm Gwen Hall, Pencader, Dyfed, Cymru SA39 9HA.
A specialist user-group for QL owners interested in adventures, simulations, strategy and wargames. QLAF publishes games and a newsletter of game reviews, playing tips, maps and general articles. Contact: Richard Alexander.

contents of files, and select individual files or groups to be erased or copied.

Copying is automatic once you've selected the files and the destination drive and directory. A neat bar graph shows you how much of each file has been copied as transfer takes place, but it's a tolerably fast process.

File translation

Files can be 'translated' automatically as they're copied. *DiscOver* lets you build files of translation information with any editor (even *Quill*). These list character codes to be changed – you can replace one character with none, one or several, but you can't replace a group of characters with one or none.

The translation takes account of the direction of transfer – source to target, or vice versa. The most common use is to change CHR$(10), the QL and Unix line-end character, into CHR$(13) or both, for other machines.

DiscOver was written in MetaComCo C, which has a bugged QL library that makes screen output appear blank if you use a screen speed-up utility. Everything works fine if you turn off the screen accelerator before running the *DiscOver* task; you can turn it on again as soon as the task is running.

Another documented incompatibility involves Ultrasoft's enterprisingly-named *Toolkit III*, which stops *DiscOver* being able to read directories and prevents access to BBC disks. All is well if you avoid this toolkit.

DiscOvered

String translation and a few more formats would be nice, along with an option to format disks, but in general *Multi-DiscOver* does a good job of transfering files to other computers. It's fast and quite easy to use, with clear displays.

Multi-DiscOver costs £39, on 5.25" or 3.5" floppy disk. The MsDos-only version, *DiscOver*, costs £29.50, and works with PCs, PC compatibles, Apricot and ST disks.

Easy to C

After *DiscOver*, written with – or rather, despite – MetaComCo C, and Chas Dillon's SuperBASIC to C translator *BASIC-C-Port*, it's no surprise to hear that a new QL C compiler waits in the wings. PDQL has negotiated the rights to convert the latest version of *Lattice C* from the Atari ST to the QL.

The compiler itself is written in C, and therefore quite portable, but the library must be re-written and rigorously tested before the package will run on the QL. PDQL intends to sell its 'port' of *Lattice C* for £59.95 – a more reasonable price than the £99.95 Metacomco charged for its bugged and dongled QL C.

The other two QL C compilers are both based on the Public Domain Small C compiler, originally written by JE Hendrix, available from many PD libraries and documented in the book *Dr Dobbs' Toolbook of C* (Prentice Hall). Small C is integer only, like its descendants.

GST C is good value for the assembler and linker included with it, but no good if you want to compile existing programs that use floating point maths.

Shopper reader DA Elgee has written in to enquire about DP's Digital C. This compiler started life in the Quanta library and was enhanced by Digital Precision before being launched onto the market at almost £40. The price is now down to a reasonable £29.95.

Digital C is a neat system which compiles and links much faster than GST's package. Rather than generate assembly code it has a specially-written linker and code-generator, driven by numeric intermediate code, like the *Turbo* and *Supercharge* code-generators from the same programmer, Gerry Jackson. The compiled code is limited, but useable and quite fast – the entire package compiled itself!

Digital C is more suitable for new programs than for compiling existing source. Floating-point maths and QL extensions are in a library rather than built into the language. This makes them rather hard to use, particularly as the **#define** pre-processor is limited and built into the compiler.

You must dimension each floating-point variable as an array of three integers, and perform operations a line at a time, so X=Y*-X becomes:

```
*X=FNEG(X)  *X= FMULT(X,Y)
```

You can't even nest the function calls, as that stops it working. We'll return to the subject of QL C in a future issue.

Contact

Investment Monitor:
Michael Slatford Software,
3 Camden Road, South Croydon,
Surrey CR2 7EQ
(01) 688 9489.

Games:
CGH Services, Cwm Gwen Hall,
Pencader, Dyfed, Cymru
SA39 9HA.

DiscOver and *Multi-DiscOver*:
PDQL, Unit 1, Heaton House,
Camden Street Birmingham
B1 3BZ.

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LQ500,LQ800,LQ850	2477DN	2.36
LQ1000,LQ1050	2478DN	2.84
LX80,LX86,LX90	2454FN	1.67
LX800,FX800	2273FN	1.93
LX1000,FX1000	2320FN	2.36
MX100,FX100,RX100	2320FN	2.36

IBM	REF. NO.	
PROPRINTER	2458FN	3.04
PROPRINTER XL/XL24	2847DN	4.48
MANNESMAN TALLY		
MT80	2698FN	3.79
MT85,MT87	2739FN	2.74
NEC		
P2200	2844RD	3.51
P1,P2,P6	2254DN	2.86
P3,P7	2260DN	3.12
SEIKOSHA		
SP-800,SP-1000	2741FN	2.36
GP100,GP250	2317RN	1.96
GP500,GP550	2236FN	1.89
BP5420,BP5405	2453HD	4.43
STAR		
LC10	2861FN	2.16
LC10 Colour	2869C4	5.40
NB24-10,ND10,NR10	2761DN	3.24
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Occam all ye faithful

by Adrian Owen

And indeed they did, to the 10th Occam User group conference. Opening a new era in implementing parallel systems

PARALLEL computing is the way program designers can get over the Von Neumann bottleneck. Conventionally a program will run on one central processor and the way we speed up the processing time has been by increasing the speed of this central processor. There is a ceiling as to how fast a single processor will run, and this is governed by the time it takes an electrical signal to travel along a piece of wire. Over a certain limit, we cannot expect the movement of data in our processor to be instantaneous as the data may still be making its way down the wire.

Sharing the load

One way in which we can potentially speed up our program is by sharing its work amongst many processors. When writing a program, we do not design it to run from start to end sequentially, with each step dependent on the others being completed. Instead, we decide that certain parts of the code can run in parallel. We split our program up into a number of separate processes that can run autonomously. We may run these separate processes in parallel on one processor that will give each of the processes a certain 'time slot'.

If we add another processor to the system, the program will run simultaneously on both of them, doubling the processing time. The more processors, the faster the processing time. This approach is open to that set of programs that can be implemented in parallel; it will not work for all classes of programs.

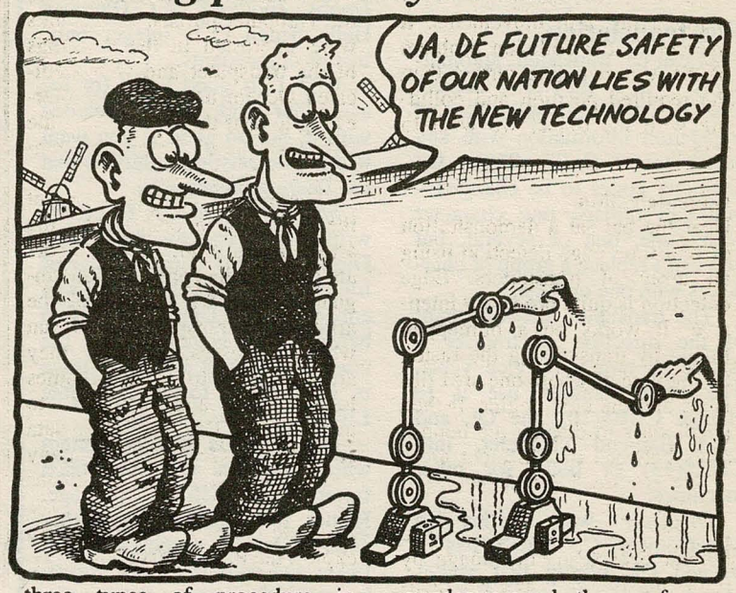
A language was designed to enable programmers to write code that could be easily distributed to run in parallel on an array of processors. It was decided to make the language 'high level' so that you did not have to be an assembler programmer to use it. The language is called Occam.

Now, what the world needed was a processor that was small and fast and could be plugged together with others in a simple and efficient manner. It required an instruction set that gave the facilities for parallel computations. It would need more than one link to the outside world, as it would be communicating data simultaneously to a number of processors. A processor was therefore designed to fulfill these criteria, and was called the transputer.

A little bit about OCCAM

Occam is the language of the transputer designed by David May from Inmos. It is the most efficient language to write transputer programs in as it is the closest language to the architecture. With Occam we can write programs to run on an array of transputers without needing to have the transputers present. These codes may describe a number of parallel tasks, but the transputer can multi-task an Occam program if there are no other transputers available, ie share out its time between the various processes.

In Occam, various control structures are available to us. The familiar WHILE structure allows us to define loops. We have various data types such as INTEGER and FLOAT. Within the code we define our procedures. There are three types of procedure in Occam: the SEQ, PAR and ALT. A SEQ procedure executes its list of commands sequentially; after it has run the last command, the procedure terminates. A PAR procedure executes all its commands in parallel; when the last of the commands finishes execution, the procedure terminates. Finally, the ALT procedure associates each of its commands with a condition; as soon as one of the conditions is met, that command is executed. A command must run and finish before the procedure terminates.



Communication between transputers is done by defining channels. We can input or output to or from a channel. These channels are the high speed links – the wire that connects the transputers together on the board.

Internal communication is neat and efficient, but headaches come when we need to talk to the outside world. Getting a line of text that a user has typed on a terminal is a single line of code in most languages, but in Occam we need to do all the work of reading from the keyboard buffer etc, ourselves.

Although Occam is generally called a high-level language, it lacks the data structures common to all other high level languages.

Going Dutch

Armed with my impeccable knowledge of Occam, I recently set off across the flat expanse of the Dutch countryside to the town of Enschede, to the 10th Occam User Group conference, held in conjunction with the University of Twente. A brief wander around the conference reception area showed various transputer vendors demonstrating their wares. On one high resolution screen, the familiar sight of the Mandelbrot set, being generated and displayed in between two and 10 seconds. A neat example of processing speed perhaps, but Mandelbrot generation does lend itself to a parallel implementation. Neither does it require a lot of memory in which its local parallel processes run. A very nice application for a multinode transputer with no external memory.

In the main dining area was a curious device which appeared to be a metal arm being swung by an electric motor; the motor is attached at one end. I could not figure out what this demonstration represented, but the Dutch academics constantly swarming around it suggested that it was something interesting. I was eventually informed that that this was a demonstration of real-time control using a transputer array. The problem is that, if we move a long, flexible arm through the air, when the arm comes to rest it will sway from side to side as the information passes from the stationary point at one end to the other end, which is still moving. This means that after every rotation of the motor we need to wait to ensure the whole of the arm has come to rest and is therefore in the correct position.

By placing a sensor at the end of the arm we can relay information about the sensor's position back to the machine controlling the motor. The machine uses a bank of transputers to analyse the

The Transputer

The transputer is the brainchild of Iann Barron from Inmos. Inmos announced the first transputers the T212 and T414 in 1985. They had a small novel instruction set and could communicate directly with other transputers via four high speed links. The program designer could plug many transputers together in various topologies to best suit the application. The T212 had on chip 2K of memory; however, designers found that most applications needed more that 2K to hold both program and data so, in practice, they extended the transputer's memory with external memory on the board.

The links between transputers are also known as channels. The speed of these channels is standard across transputers at 10Mbits/sec. This means that the rate of data transmission through a transputer network is proportional to the number of transputers. So we may increase our data rate ad infinitum and as new faster transputers become available they can still communicate with older networks at this standard data rate.

sensor's position in real-time. It then counteracts the arm's sway by acute left and right motor rotations, which earths to sway quite rapidly. The result is that, on stopping the arm, the far end comes to rest rapidly. This simple application has important implications for anyone using long robot arms in exact work which requires fast arm movements. It overcomes the collision problem of the arm swinging further than the required position and colliding with the object we wish to select.

Edge detection

Near the bar sat a demonstration of real-time edge detection using an array of transputers. Edge detection is quite processor intensive. It works on a bitmapped image by transversing the raster, taking note of where one area finishes and the next begins. It then needs only to display the boundaries between the different areas in the picture. Edge detection is thought to be the first stage in the process of perception. The human eye cleans the image by removing noise. When we eventually pass the image onto the semantic net to analyse what we are seeing, the task has become easier as we now have an image of where all the objects lie within the scene and have, hopefully, removed any misleading information.

The politics of the transputer

It was interesting to note that the conference was split into two camps. There were the folks who simply used transputers as general purpose workhorses. They were at the conference to discover what was going down as far as new transputer products were concerned, and to take a look at some of the applications of transputers presented in the papers.

On the other side there were the Tranputer purists. These folks were interested in the workings of the transputer and were dedicated Occam users. It was interesting to hear their debates on the shortcomings of the present generation of tranputers.

There were complaints about the difficulty in configuring the array. When a lot of processors are present, the configuration language which we use to tell the array which transputers are to run which processes, and how they are connected together, becomes long-winded and difficult to understand. The lack of data structures in Occam forced many users to use alternative languages such as C, which do not have the inherent parallelism required to exploit the transputers fully.

Next month

Next month I shall explore the tone of the conference in detail and look at some of the papers presented. The description of Occam I have given here is enough to give readers an idea of what Occam programming is about. For a more complete language description see the Occam programming manual supplied by Inmos.

Occam code

```
SEQ
      Process1
      Process2
      Process3
```

The SEQ construct specifies that these 3 processes are to be run in sequence, one after the other.

```
PAR
      Process1
      Process2
      Process3
```

The PAR construct specifies that these 3 processes are to be run in parallel.

```
      Fredchannel ? value
```

The symbol ? specifies an input from the channel Fredchannel into the variable called value.

```
      Bobchannel ! result
```

The ! symbol specifies an output to the channel Bobchannel from the variable called result.

```
ALT
      Fredchannel ? value
            Process1
      Joechannel ? count
            Process2
```

The ALT construct specifies that Process1 or Process2 will execute, depending on whether Fredchannel or Joechannel is ready first.

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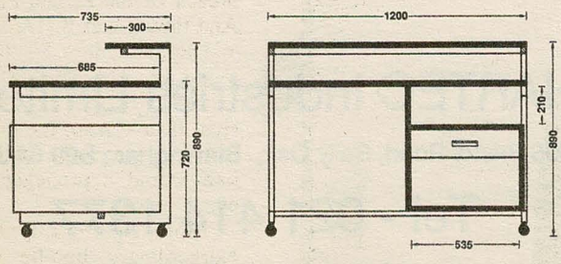

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Babble

by Greg Ingham

While Commodore, Amstrad and Atari battle to see who can lose the most money, the rest of us are snoozing with the Software Show

Sweet talkin'

Were Amstrad a Greek tragedy, we'd know what to expect next. We've had the not inconsiderable hubris of Alan Sugar, wantonly jousting with the gods. Enemies real and perceived have been despatched. Rivals, journalists, City experts and even the tea-stirrers at his Brentwood HQ have all been bashed over the head. Howsoever aggressively he and his bearded beastie boys behaved, Sugar has ruled supreme as the computer king.

Since the CPC's April 1984 launch to a largely – and wrongly-sceptical bunch of pundits, Sugar has had the best part of five years of lording it over the market. Tales genuine and apocryphal illustrate his indomitable self-belief. The literal truth, as the Bishop of Durham would have it, is not the issue: only the ready willingness to believe is what matters.

Try this. On one memorable occasion back in the early days, a games software house boss was close to sealing a deal with Amsoft, only to encounter a delay. He telexed Sugar to see what the problem was, apparently only to receive a two word reply. And yes, the second word was "off".

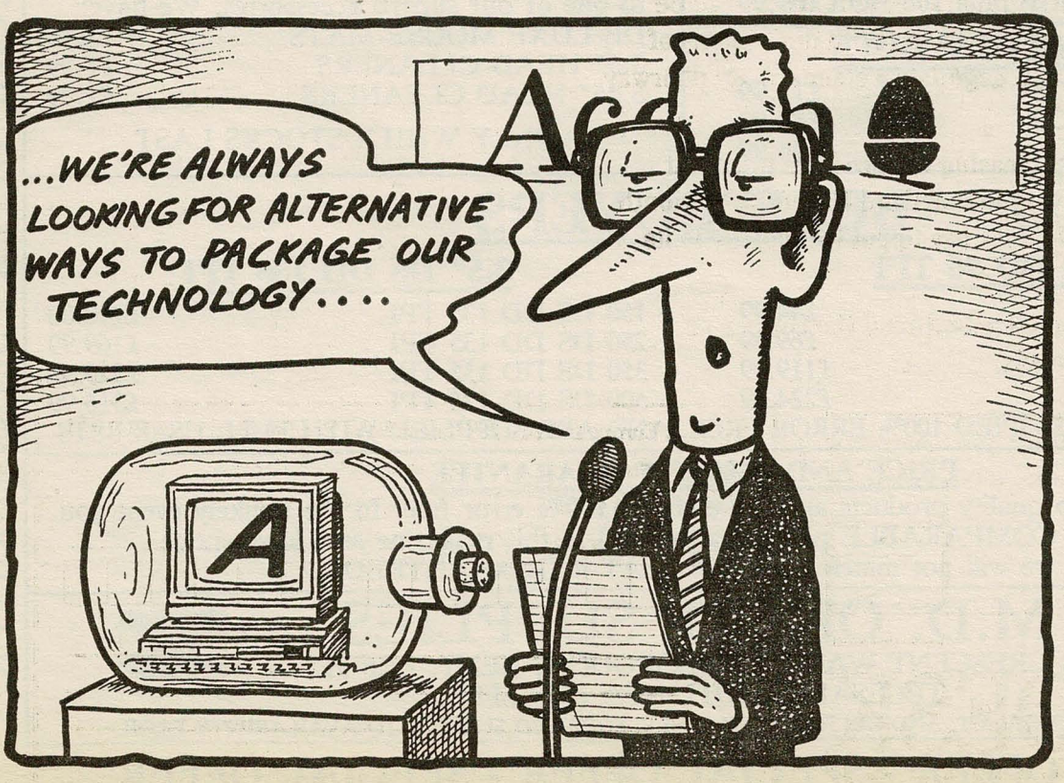
As Amstrad has hit problems, it's not been that easy for the computer trade to sympathise. Few mourned the other day when Sugar warned that Amstrad's second half profits would not even meet the already lowered expectations. Instead, the calculators banged away to discover that with £120 wiped off Amstrad's Stock Market value, somewhere around £50 million of Sugar's notional personal fortune had disappeared. To lose one pound is unfortunate, but to lose fifty million of them...

And yet for all this, there was widespread acceptance that Amstrad's problems with its 386 machines had little to do with the firm itself. It turned out that there was a bug in Version 4.0 of Microsoft's MsDos bundled with the machines. Sugar duly went into his "It's nothing to do with us, chummy," mode, and the trade press acquiesced. One paper offered, "Amstrad was last week acquitted of all blame surrounding faults discovered in its flagship 386 machine."

Well, up to a point. If you seek to gain the kudos of having the newest version of software available, then you must also recognise the possibility that a largely untested product could well be bugged. In this market, such a notion is not novel. You should either leave it until it's been market-tested, put your own techies onto it, or else accept the consequences. Amstrad couldn't wait for the first, apparently hasn't the strength for the second and can't stomach the third.

In the past, Amstrad has more typically attached itself to older, market-tested software. It has, after all, just announced yet another bundling deal, this time with Lotus for its couple-of-years-old *Symphony*. With its pile 'em high, work to a price and be pragmatic about the tech spec approach, it has simply not needed to concern itself with being state of the art. With such machines as the PCW – a techies' nightmare, but so what? – it has consciously eschewed the notion of competing on other manufacturers' home grounds.

But now it has had to make the great leap upmarket, technical matters have to be uppermost. Hence its national press advert on the day after it shed £120 million on the Stock Exchange: "...clock speeds ranging from 8 Mhz to 20Mhz... 1:1 disk interleaving...64K of 35ns RAM cache memory... and a full speed, full width bus..." That's not quite the "shove it in and away you go my son" Amstrad pitch of yore. Whisper it who dares, but part of the firm has gone native. Trouble is, not enough of it.



Never say die

It would be a rum world indeed if it were only Amstrad that had difficulties. Commodore, too, has encountered a wee patch of turbulence. And even more so than Amstrad, it's been of its own making.

Somewhat implausibly, the first problem has been with the Amiga 2000. In the great scheme of things, this is not a machine which animates the minds of the chattering classes.

Targeted largely at the arty farty stripey shirt creative and media conceptualists, it is deemed to be a niche machine. Translated, that means it wasn't expected to sell many, and has duly been on schedule since launch.

So how do the Commodorians manage to have problems? Surely the A2000 has not managed to become a mass market machine?

Nope. Instead, it was at the centre of a row between Commodore and the Office of Fair Trading. A year ago, Commodore banged off a missive instructing dealers to stick to the recommended retail price for the machine, or else have the wrath of Hades descend upon them – which in retail terms means losing your official dealer tag.

At the time, this always seemed rather droll, perhaps even an inventive publicity scam. "We only ever sell half a dozen a month of these beasties, so let's try and drum up some controversy by imagining that there's widespread price-cutting" – that kind of thing. As a Pressing Topic of Our Time, it seemed to get lost amidst discussion of last summer's weather and other such crucial matters.

It lay dormant until another "very significant computer company" (no names from the OFT) complained that it represented a breach of the Resale Prices Act. And thus it was that Commodore had to lurch into Sir Humphrey mode and "clarify the position" ie, roll over and play dead. The rival firm – who, for the sake of example we could call Atari – had scored a propaganda bullseye.

More significantly came the extraordinary hoo-ha over the C64. This is what is known in the trade as a Very Old Machine, and Commodore has been encouraging it to roll over and die for a

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Continued from page 141

number of years. Privately, it has been embarrassed to have the 64 still around in this brave new world of the Amiga.

All of a sudden, through a combination of an excellent bundle and Amstrad's 8-bit screw-up last autumn, sales of the C64 suddenly took off. It recorded its best Christmas in years; the ugly duckling rapidly switched its metaphors to become the goose that laid the golden egg.

It is at this point that versions differ. Either the C64 was then discovered by dealers to have a "35-40 per cent", "40 per cent", "nearly 50 per cent", "70 per cent" or "80 per cent" failure rate (according to dealers volunteering the figures to trade paper *CTW*) or "approximately 2-3 per cent" (according to Commodore) – and then "6 per cent" when pushed on it once more.

Faced with such figures, caution is called for. It is very difficult to believe that one in four, let alone four in five 64s are faulty. Elementary commercial imperatives dictate that Commodore can't be that bad or mad.

And yet that is what is being said. What has also been revealed is Commodore's method of testing: 25 computers per 1,000 are analysed and the whole batch is consigned to the dump if 2 per cent are found to be faulty. That 2 per cent sounds even more like an arbitrary figure when you realise that it equates to half a machine.

With testing like that and claimed faulty levels like those, Commodore would appear to have three options.

1. It could sue the dealers for claiming the levels to be so high. Disadvantage: It would smack of Amstraddian tactics and thus alienate everybody. It could quite easily lead to the discovery that faulties are actually higher than 6 per cent, if not quite 80 per cent.

2. It could go for the PR angle of announcing some bold new initiative to revolutionise its quality control, make a significant investment, have a major reappraisal etc etc. Disadvantage: The age of innocence has disappeared – no one would believe it.

3. It could shove its head in the sand and hope the world looks like a different place when it comes to selling C64s again in earnest next autumn. Disadvantage: Some cynical pundit is already willing to bet £10 with anyone that this is exactly what it will do.

Double juggle

Customarily, problems at Commodore prompt chuckles at Atari. The characters employed by Jack Tramiel are just so aggressive that they can't do anything other than chortle when Commodore fouls up with This or That great new idea.

But for once, the bigger foul up has happened with Atari. It has just contrived to lose $84.6 million in its financial year. Now you'd really have to go some to burn up that sort of money. There'd be no let up for a whole year as you'd spatter your largesse hither and thither. OK, so losing 84.6 million bucks is probably bad news when all is said and done – but at least you'd enjoy yourself doing it.

Not Atari. It lost the money boringly, waiting for its loss-making US retail chain Federated to turn an honest bob or two. It either couldn't or wouldn't. Whatever, it didn't: Atari has written off $100 million of its losses and put it up for sale. To make this even less attractive, prospective purchasers know that Atari is also in the process of sueing it for $130 million.

Yet despite this, Atari can still permit itself a chortle or two at Commodore's expense in the UK. Atari's market share leapt from 5.6 per cent to 9.6 per cent – which in the peculiar language known as Atarispeak qualifies for the description "doubling". Commodore, for all its revival with the Amiga and major revamps of its PC line-ups, actually fell from 4.2 per cent to 3.7 per cent.

Now the only trouble with such market research is that it is true and valid and meaningful right up until the point that another load of research comes out to contradict it. Then, you either jump ship and say that the new lot stacks up, or you say it doesn't, or you say that the computer market is irredeemably unresearchable and that none of it matters anyway.

To this, if you were a cynical computer journo with column inches to fill, you could add "oh to be a market researcher now that summer's here". For in the absence of anything substantial to report, researchers know that when it comes to such reports, the hacks aren't interested in doing much other than regurgitating huge gobbets of undigested information and slapping in a few pie charts to lend validity to the whole tawdry exercise. Oh, and they can usually trouble themselves to produce a few post-prandial paragraphs to the effect that the results were pretty much in line with what they expected them to be, thus adding credibility to both parties.

God forbid that they should actually lift the skirts of market research and say "Can it really be true, as Dataquest's figures indicate, that Atari has closed the gap on Amstrad in the UK from 16.3 per cent in 1987 to just 4 per cent in 1988?"

Clapped out?

It has to be said that the predicted stripped down Archimedes (Babble, May) has still not quite happened. Remaining in a minority of one in this matter, I'm beginning to lose a little faith in my sources. People – well, two, to be precise – insist that they have seen the wee beastie, but Acorn is now actually denying its existence, rather than teasingly offering "We're always looking at alternative ways to package our technology" (*Shopper*, same issue).

Perhaps, as I'd thought, the prospect of having a mass market machine once more is a little too alarming – that the company is now a serious business outfit geared up to filling niches. Plans for the baby Archie have thus possibly been scuppered; collapse of journalistic party. Well, it might still happen. But don't hold your breath.

In the meantime, the old Cambridge coves have been making another pitch for the limelight. Firstly, the Acorn-sponsored BBC Micro Show has been closed down. Held 20 times to date, its attendances of late have been modest. "It was getting to the stage where not only would you recognise all the exhibitors, but most of the visitors as well," show organisers Database offered engagingly.

For all its high sales in the early '80s, Acorn just hasn't been able to sustain interest in its machines – or at any rate, fostered the commercial links between the Beeb and the Archie in the same way that Commodore has encouraged the notion that the C64 and Amiga actually come from the same company.

Part of the problem is that whilst punters were willing to pay through the nose in the pre-lapsarean, pre-Amstraddian days of '82 and '83, they just aren't now. For without wishing to go out on a limb, in the past Acorn's machines could be said by some to cost occasionally on the high side of what might have been expected. In short, they've been impressively over-priced.

The customary approach in the computer business has been to increase specs and reduce prices. This has enabled some idle boffin to calculate that had cars been computers, we'd now all be capable of driving from here to Peking and back in 1.6 nanoseconds for 68 pence. Or whatever.

Yet Acorn, of course, has long been a world unto itself. No surprise, then, that for no immediately apparent reason it should jack up its prices by an average of £65 on each machine. Sure, its RISC OS is now being included. But other demonstrably more successful manufacturers bundle willy nilly (the names of Amstrad, Commodore and Atari spring to mind, for some reason).

In an age of conformity, such idiosyncracy is to be applauded. Unless you're just about to buy an Acorn machine...

Gong show

And now, an everyday story of broadcasting folk.

Once upon a time, there was a television programme called Micro Live. It took as its premise the singular notion that Open University programmes were dangerously exciting and operated with too large budgets.

Armed with the televisual equivalent of thruppence, Micro Live seemingly set out to illustrate that not only were computers dull but that their adherents were social retards at best. Implicitly, sometimes even explicitly, the message was drummed home that computers can only possibly appeal to the nervous outcasts of society, those afflicted with *anoraksia nervosa*.

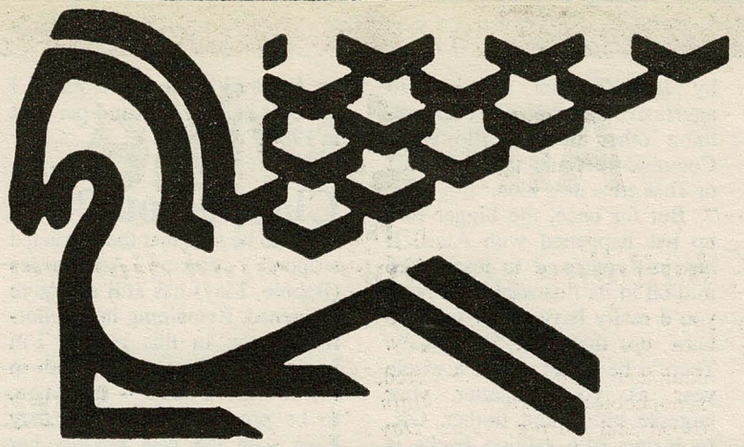
Predictably, even the anoraked boffins stayed away in their droves. For some crueller pundits, the show (ha!) attained cult status. They marvelled that it was possible to find presenters with less sartorial elegance than golfers and more lumpenly patronising techniques than Blue Peter people.

Micro Live became Micro Dead. Few mourned. Connossieurs of kitsch demanded repeats. Nothing happened for a couple of years.

And then, the other Sunday, two and a half hours were devoted to The Software Show, and suddenly the BBC's intention became clear. Produce a programme that is so boring that it doesn't even fall into the "so bad it's good" category of Micro Live, and you're onto a winner with the Board of Governors.

How so? Well in these days of Murdoch and satellite and de-regulation, the Beeb has to do anything and everything to avoid shedding viewers. And whereas in the early days micros were solely seen as a means of generating revenue via the ludicrous Acorn royalty on the BBC computer, now they're regarded as a ratings-threatening home activity. Thus make them seem unconscionably tedious and limited, and you might prevent sane folk from turning away from the telly.

There is no other explanation. Computers are now present in one quarter of British homes. The fightback has to start somewhere.



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Amigaville

by Phil South

Space Quest II, building your own sound digitiser and the Amiga good book guide: just some of the goodies in Phil's lucky dip

HEY AMIGANS! I'm afraid this month is trifle flaccid compared to last month. All that pizazz – *DPaint III*, Dan Silva – a bit of a tough act to follow. Still, we'll cobble some stuff together. It'll be alright – just add a stock cube and everyone will think there's some meat in there...

Demos. Love 'em or hate 'em, you can't go anywhere without seeing 14 new ones. You recall I told you about the *Wild Copper* demo? Well, many people have phoned and written to me asking where they can get a copy. Look! I do have a copy, but it would be easier for me if you sent off to 17 Bit Software for it (address at the end). I think it costs something like £2.50 or thereabouts. While we're on the subject, I can highly recommend 17 Bit's PD disks 89 and 257. Brilliant music and impressive graphics. Where do all these little German hackers come from??? On the subject of demos, watch out for the Des O'Connor one which a couple of friends of mine did a while back. There was a Kylie Minogue sample and IFF pic demo doing the rounds in recent weeks, but the Des one wins hands down for sheer undiluted YUCKINESS!

Amiga rumour mill

I've seen a lot of French computer games lately, from Infogrames and ERE Informatique, mainly. I admit I was prejudiced against them to start with. "What do these French froggies know about computer games?" I muttered, xenophobically. Then *Captain Blood* and *Purple Saturn Day* came out from Exxos. Now, having seen *Hostages* and *Operation Neptune* from Infogrames, I take it all back. *Operation Neptune* is a water-based game, and by that I mean you are playing with subs and frogmen, not the kind of game that melts when it rains. You race along the sea bed in your high tech sub, blowing the stuffing out of everything that moves. When this isn't enough, you swim out of the ship and take on the enemy hand to hand, like a sort of aquatic Rocket Ranger. The game isn't at all bad, and plays very well. The pre-title sequence is longer than most games and has you speeding along on a jet bike to rendezvous with your sub, pursued by an enemy agent. It's out now from Infogrames, (01) 364 0123, priced at £24.95.

Electronic Arts, after the spurt of activity it enjoyed last month, is settling down to rake in the profits from *DP III*. In the meantime, it could possibly have a hit with the Amiga version of *Powerdrome*. The game was originally programmed on the ST, and it was very hard to play. Now it has been tweaked, so the Amiga version should be about 600,000,000 times better. The game has a special two-player mode which allows players with two computers to play via serial data link. Even players with one ST and one Amiga can enjoy the splendid graphics... well, the Amiga player can. The ST owner will have to use his imagination a bit. *Powerdrome Amiga* is out in May, priced £24.99. For those of you who missed out on EA's classic releases for the Amiga, now is your chance to get them. In May, the Software Classics line will be released, with a number of old full-price titles at a new low price of just £9.99! The list includes: *The Bard's Tale*, *Chessmaster 2000*, *Marble Madness*, *Skyfox II*, *World Tour Golf*, *Arcticfox*, and *The Archon Collection*. Bargains, all of them. Watch out for them at your local stockist.

The Sales Curve has struck a deal with Virgin Mastertronic, whereby VM will sell licensed games produced by The Curve. The Taito games *Ninja Warriors* and *Continental Circus*, plus Tecmo's *Silkworm* and *Gemini Wing* are brilliant arcade games and they should make brilliant 16 bit games. Also, from VM's aged Melbourne House label, comes *Shinobi* – not to be confused with shidoobi, which is the backing vocal on the Rolling Stones tune 'Shattered'. *Shinobi* is Japanese for 'stealth', and sneaking up is what you have to do. A martial arts game par excellence, *Shinobi* should be out 'real soon now' on all 16 bit computers.

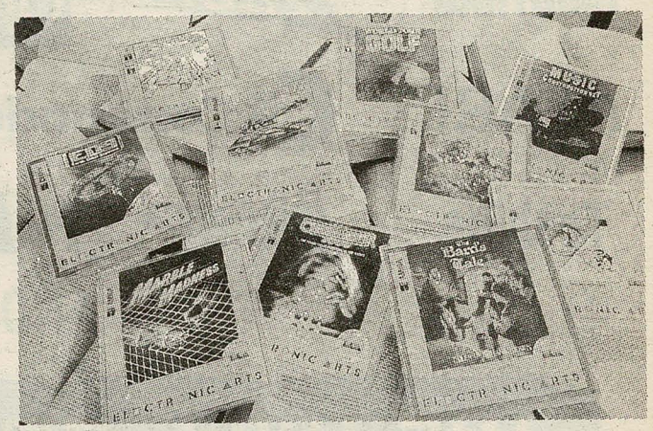
Activision had a nice bit of publicity the other day on ITV's *Motormouth* for its conversion of *TimeScanner*. Neil Jackson, the tall one with the flat-top and the company's software producer, demonstrated the game as part of a History of Pinball. Very shrewd, Accers. The schedules for the upcoming Sierra-On-Line releases mentioned last issue are out. *Kings Quest IV* is out in July, *Leisure Suit Larry II* is out in April, *Police Quest II* is out in June, *Space Quest III* also in June, and *Silpheed* in April. The usual price is £24.99, but it may vary for the bigger games. Check with your local supplier or call Activision's Customer Hotline on (0734) 310003.

Anakin Research of Ontario, Canada is keen to tell me about the Easyl graphics tablets for the Amiga. The Easyl is a pressure-sensitive tablet on which you draw with any pen or pencil of your choice and the image comes out on the Amiga. The tablet fools the Amiga into thinking it's the mouse. Although the Easyl uses mouse commands to run, the mouse is still connected, so you can switch from mouse to pad in seconds. Sounds perfect, yes? Okay, the drawback is the price – a gnat's tackle under 500 bucks, or about 300 quids – but for pro applications its digitising quality is unsurpassed. Ask your local dealer for details, or draw a line to Anakin Research, 100 Westmore Drive, Unit 11C, Rexdale, Ontario, Canada, M9V 5C3, or phone 010-1-416/744-4246.

An insert fell out of a mgazine

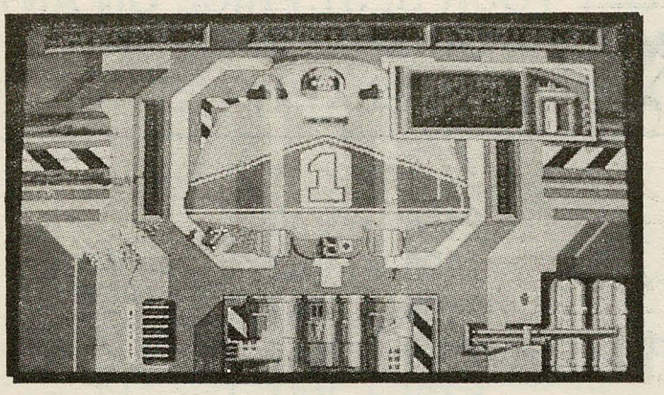
Continued on page 147

Software Classics



Electronic Arts' Software Classics line for the Amiga will include The Bard's Tale, Marble Madness, The Archon Collection, Skyfox II and Chessmaster 2000

Powerdrome



Powerdrome has a special two-player mode, allowing players on two computers to play each other via serial data link

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Continued from page 145

I was reading the other day. Like most people, I usually toss away magazine inserts, (much to the chagrin of most of the people I work for, who put them in there). This one, however, caught my eye. CompuAdd is one of those catalogues that they slip into magazines and, unlike many of the others, the prices are very reasonable. Take CompuAdd's switch boxes, for example. Some magazines and catalogues advertise these simple devices for about £70 – for 25-way D switch boxes!!! The same items in CompuAdd are just £9 to £14! Gender changers and Null Modem converters are just £6! I stuffed the catalogue in my bag and ordered some bits from it right away. Brilliant! So look out for the CompuAdd catalogue next time you're weeding the rubbish out of your magazines. If you can't find one, then don't worry. Call CompuAdd free on (0800) 373535 and ask for one.

Eek! Sorry guys, I'm a prat. I freely admit it. I said last issue that *Roger Rabbit* bombs out under 1.3 ROMs. It doesn't, as my Amiga buddy Mike Gregory has finished the game on his 1.3 Amy. So, if you want to buy the new bundled package containing a copy of Roger Rabbit, go right ahead. It's a brilliant game. I was wrong! So kill me! Sorry for the confusion, but my doctor warned me I shouldn't play with sharp objects like computers...

Tales of the Euro Show

I went to the Euro Computer Trade Show the other day and saw a lot of very interesting stuff. Take *C-Light*, for example. *C-Light* is a new raytracing package by Artronic which gives a similar effect to *Sculpt 3D*, but because it uses low res and faster algorithms, it renders objects in an hour instead of a day! It does animation too, and all for just £49.95! To order a copy direct, write to Artronic Systems Ltd, 1-3 Haywra Crescent, Harrowgate, North Yorkshire HG1 5BG, or give them a ring on (0423) 525325 for further details of what the system can do.

Another item I saw at the Show was Maxa-Fit. Now this product looks like a bit of plastic which sits on your printer. Which isn't surprising, as it is just a bit of plastic which sits on your printer. I thought it looked pretty stupid, but then the nice man showed me what it could do, and I nearly spat out my chewing gum. It's a cut-sheet locator and aligner. It allows you to just drop a sheet of paper into your printer, aligning it perfectly every time. Now I know all you fancy chaps who have brand new printers with sheet feeders don't have any problem, but we mere mortals, whose printers were manufactered by Gutenberg, need a little help. The unit fits any size of printer and has its own quick-release clamps so you can whip it on and off in seconds. It accurately feeds a sheet into a printer, so you can even overprint in many colours on the same sheet of paper! The man dropped a sheet of paper into his printer and printed out what seemed like a page of nonsense. Then he dropped it back into the printer and overprinted it with more nonsense. The gaps in the first print were filled by the impressions of the second, making perfect sense, and producing the advert that I took away with me. I'd seen it with my own eyes, and I still didn't believe it. Frankly, I was stunned by this gadget and, like most brilliant inventions, it's simple and cheap. Maxa-Fit costs just £30 plus VAT and postage and packing, from Margin Maker, Box 121, Gresham Road, Staines, Middlesex TW18 2AJ. Send off for a leaflet, anyway.

Those of you who came to the Amiga via the C64, and there must be some of you, will remember Jeff Minter. Jeff did more than most for the craft of computer games, and he still

Review

Space Quest II
Sierra-On-Line £24.99

HAVING played *Leisure Suit Larry*, I thought I knew what to expect from *Space Quest II*. Alas and alack, I missed out on *Space Quest* itself, but *II* must be better than *I*, I kept telling myself.

The game begins with you as Roger Wilco, unwitting space hero, sweeping the deck of the Xenon Orbital Space Station 4. You are the head janitor which, as there is only one janitor, makes you number one in a field of one. The beeper goes off on your wrist, summoning you to the presence of your Captain. You are ordered to clean out the shuttle, as one of the passengers was sick on the way down to the station. Yurgh. You enter the shuttle and disturb some aliens who have stowed away on the ship. They club you senseless (not hard, as you're pretty senseless already) and take you to their leader. Their leader is none other than Sludge Vohaul, the villain you defeated in *Space Quest I*. (I did? No, I didn't!). He tells you of his plan, like all good baddies, and then packs you off to a planet from which there is no escape... Owing, however, to an accident you escape the clutches of your captors. (Hooray!). But you're trapped on the planet and need some means of escape. (Boo!). And so it goes on.

Space Quest is a 3D adventure game, which doesn't mean you have to wear funny glasses or anything – just that the game is played with a screen which has depth; you can walk back and forth as well as from side to side. Movement around the screen is either by cursor keys or by the use of a joystick. It takes you a while to get used to the idea of how the game works but, once you get involved in it, it takes on a life of its own. Other creatures are living on this so-called deserted planet, and you must communicate with them if you want to survive.

I've been playing the game on and off for a week now. My big break in the game was when I discovered the way to get around the planet. Not easy when you think in only two dimensions. The graphics on this new edition are much improved over the slightly blocky graphics of previous Sierra games. It's really strange – I never minded Sierra games looking slightly old-fashioned because the text of the games was so good that I forgot how simplistic the presentation was. You can type in your commands in the usual way, or merely indicate with a gesture from the joystick what it is that you want Roger to do. There is a fair amount of Artificial Intelligence in the game. If you do the right thing in the right place, the game itself helps you out.

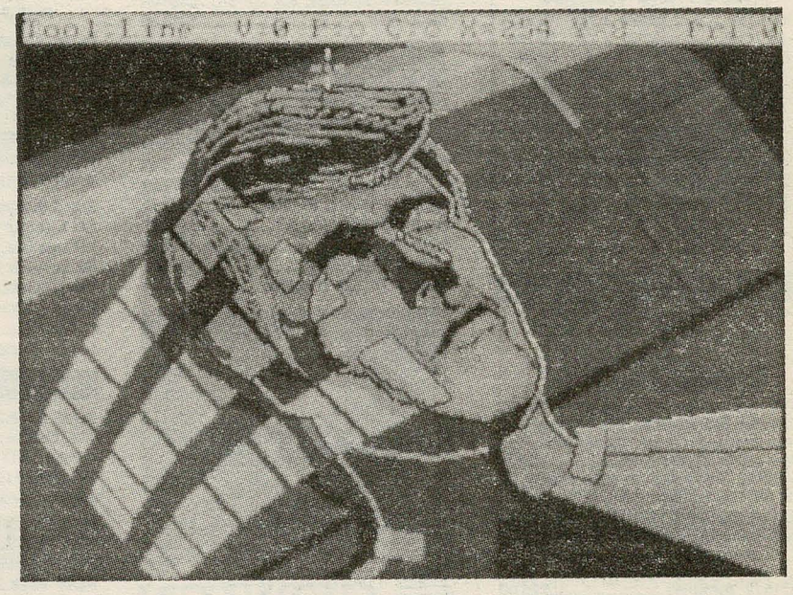
The other thing I like about the actual scenarios is that they are multi-ended, so rather than just the one path existing through the game to the solution, there are many.

The game comes free with a comic book, *Space Piston*, starring Roger Wilco and including a run-through of the first bit of the game. This is only if you need some help. Okay, so I needed help right away. Hmmph.

There's lots to *Space Quest II* and it gives good value in both the difficulty and humour of its scenario. I highly recommend playing this game with two players; one controlling Roger and the other leaning over their shoulder, feeding the player with ideas. This makes it more of a social event and a lot more fun, too!

Now I just have to find a way past the water creature. Any ideas? What? You haven't got it? Well, get down the shop and buy one. I need some help around here!

Space Quest II



Space Quest is a 3D adventure game in which you play Roger Wilco, a witless space janitor captured by aliens

Continued on page 150

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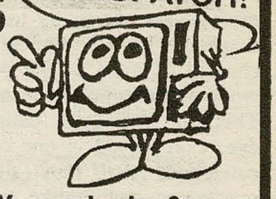

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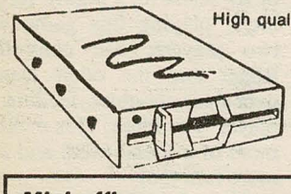

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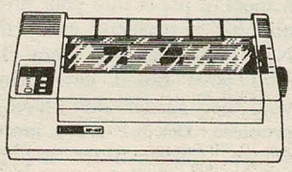

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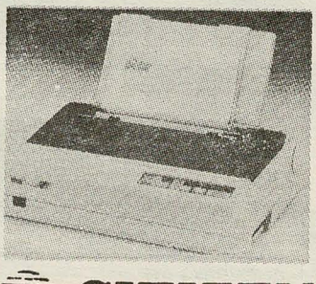

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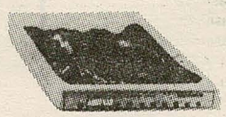

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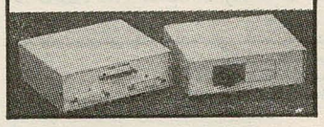

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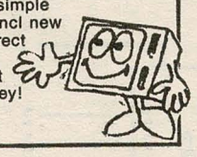

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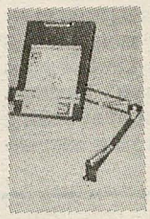

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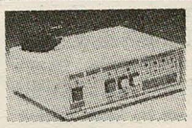

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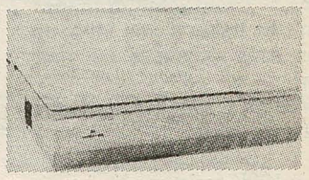
CAMERON A4 DESKTOP SCANNER



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FOR OTHER ACCESSORIES PLEASE CALL

Continued from page 147

does, albeit for the crummy ST. Once he made a program for the C64 called *Psychedelia*, a sort of Light Synth, which allowed you to program various light displays and move them around to music. *Psych* became *Colourspace* and, latterly, *Trip-O-Tron* on the ST. Now his magnificent *Trip-O-Tron* is coming to the Amiga, as he told me at the show. I like Jeff, though it's hard to get on with a man who is suspicious of journalists; but I digress: buy this man's products – he's an effing genius.

By the way, watch out for a program calling itself *VirusX3.3*. Apparently, there is a program by that name floating around and it is, in fact, not any kind of virus killer but a 'Trojan' program. You run it, and instead of duffing over the viruses in your computer, it goes and installs a couple. So only get programs from reputable sources – like me, for example.

Watch out for the review of Eidersoft's ProSound Designer in the next issue. Yes, folks, all the problems with the postal service have been ironed out. I hijacked a postie and didn't give him back until the unit was delivered. Shame he had to go back, really. He made a good cup of tea.

Free offers

As I said before, send me a small jiffy bag with a 24p stamp on it, and a blank disk in it, and I'll send you *VirusX3.2*. This program is essential if you want to fight back in the virus war. To use it, just boot your Workbench disk, pop the *VirusX* disk into the drive, and double click the *VirusX* icon. Then press the right mouse button and the *VirusX* menu will pop up. From then on, any disk you put in any drive will be read for viruses; it copes with about 15 different types.

To squash some of the easier problems had by *Shopper* readers, I've compiled an Amiga Beginners' Guide fact sheet. To get your copy, simply send a self-addressed A4 envelope with a 28p stamp to: Beginners Guide, Amiga Section, *Computer Shopper*, 14 Rathbone Place, London W1P 1DE. Don't forget the stamps or I'll use your envelope to light my boiler.

Amiga biblio file

I get a few letters asking which books are best for the Amiga, on all kinds of subjects – C language, Basic and Intuition... all kinds of stuff. It's difficult for me to recommend any except the ones I've read, not being what you might call a book reviewer, but I do have a lot of books. So here's my roundup of the best in Amiga reading.

The *AmigaDOS Manual* (Bantam Books) by Commodore-Amiga Inc is the best guide to the Amiga's Dos and a good few other things besides. In here, you can find all the basic information, but you have to delve around a bit.

If you want to be an Amiga Programmer, then you must have this: *Amiga Basic* (Commodore-Amiga) – the Basic manual you got with your computer. One of the better books on Basic, but not

Digitise it yourself

Yes, now you can digitise sounds with this fab new sampler that you can make yourself. I'm sorry, but the squeezy bottles will have to stay under the sink for now. For this we'll need some serious electronics. You'll need a little experience in electronics – nothing fancy, you just need to have made something else using a circuit board. And remember at all times, *Computer Shopper* won't be liable if you blow up your Amy – you're on your own!

The DIY sampler needs the following parts:

- 1 x 100K resistor
- 2 x 1nF capacitors
- 1 x 47uF capacitor
- 1 x Analogue to Digital Converter (ADC 0820)
- A veroboard to put it all on
- A 25-way plug to fit the parallel port
- A method to connect the amp to the audio in of the sampler, maybe a jack socket of some sort, but please yourself

For sampling you also need a piece of sampling software, of which there are many, especially in the Public Domain. Sampling gets its name from the way the ADC collects the sound you want to record into the computer. It 'samples' the sound intermittently, but at such a fast rate, and so close together, that the sound appears continuous. In fact it is made of thousands of tiny steps, or samples.

The construction of the sampler is fairly simple. The ADC is what is known in the trade as a 'half flash' converter, which in English means it's very quick. The sampler works on the parallel port of the Amiga, where the strobe line is connected to the pin on the chip which starts the sampling process.

The output and power lines of the chip are just connected straight through to the port's input and power lines. (See the figure 'Chip to port connection'). Once these connections are made, you can attach a source to the input line and run a sampler program and – BAM! You're digitising.

If you find that the line outs of your CD player or tape machine aren't man enough to boost the signal, how about this little amplifier which plugs right into the serial port? (See the figure 'DIY amplifier').

For this you need:

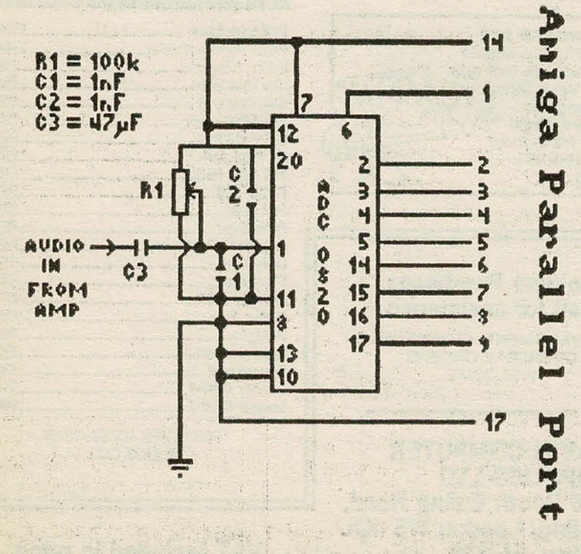
- 1 x 1M resistor
- 1 x 100k resistor
- 1 x 741 chip
- another (smaller this time) bit of veroboard
- a jack plug

Just wire them up on the veroboard and attach a jack plug to the output. Then, using R2, you can adjust the gain of sounds going into the sampler. Carefully solder the components onto the boards and break the tracks around the components to make nice, neat circuits.

Now all you have to do is try it out. No, you switch it on first! Good luck with your constructing, anyway.

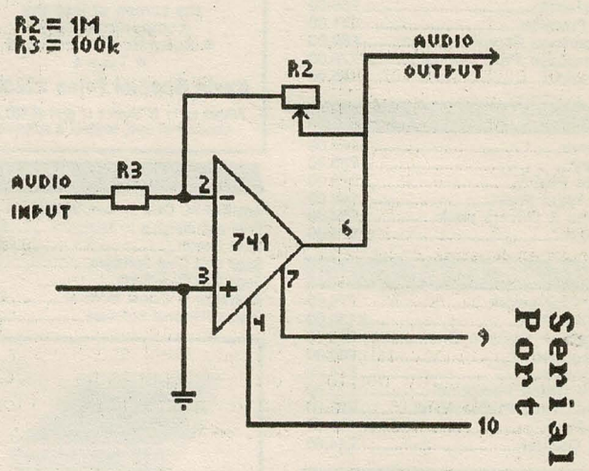
(Thanks to Yuri Large and Paul Bamborough for permission to reprint this design from AUG News).

Chip to port connection



The output and power lines of the chip are connected straight through to the port's input and power lines

DIY amplifier



To make the amplifier you wire up the components on the veroboard and attach a jack plug to the output

as good as the *Inside and Out* book which I'll mention in a minute. But don't make the mistake of discarding this one along with the *Introducing the A500* book. I know the other one is incomprehensible and contains a lot of omissions, but this one is good reading and will do until you can afford the Abacus one.

AmigaBasic Inside And Out (Abacus) by Rügheimer and Spanik is a book which is never far away from me; I read it all the time. I got my copy free with Hisoft Basic and I haven't put it down since. It's readable, informative and, considering it's translated from the German, even funny on occasions. It's a thick tome, over 530 pages, but it's got everything you need to know about the language. Although I'm learning C now, I used Basic for 11 years before reading this book. Shame it wasn't around 11 years ago. If you are a complete beginner, this is the one for you.

Hackers Handbook III (Century) by Hugo Cornwall is, unfortunately, responsible for feeding the media's misunderstanding of hackers. I for one, considering myself a hacker in the old sense of the word, one who spends his time twiddling with computers, wish everyone would go away and leave hackers alone. There are only about five people in the country who are capable of massive computer fraud and who, like Hugo Cornwall and Steve Gold, are earning enough money talking about computer security not to need the money. If you're interested in modems and computer communications then this is the place to read about them. My favourite book at bedtime.

The *68000 Reference Guide* (Melbourne House) by Woodcock and Burkitt is totally meaningless if you don't know machine code but, if you do, it's a whole little library in itself.

The Kickstart Guide To The Amiga (Ariadne) by Dave Parkinson is one of the most comprehensive programmers' guides around, and very easy to read too, even if you're not so hot on technical stuff. It contains all manner of technical tables and info, incuding hints and tips which Commodore doesn't tell you.

Inside The Amiga With C (Howard Sams and Company) by John Thomas Berry is the beginner's book of the C programming language and is very readable. I think you ought to set aside about four hours a session if you intend learning from this book, allowing for compilation and running, then debugging, compilation and running again. Like most languages, C isn't just a program, it's an attitude. Not really a part-time pursuit. Lovely book, though.

Enhancer Software Manual (Commodore): By the by, I'm being a good boy today – after slagging Commodore off for so long, I don't want to push my luck. So here's something they did right. This is the book that comes with the Workbench 1.3 disks and it's very nice indeed, covering a lot of the ground in the AmigaDos book, but a little clearer. Brilliant software too!

The *Amiga User Group Newsletter* (*AUG*), bimonthly: I can't omit one of my favourite pieces of reading matter, *AUG News*. This is written by Amiga users and contains all their hints and tips; for example, the MIDI interface plans I printed the other month. They originally appeared in the *AUG News* and I was given permission to reprint them by Yuri Large, the editor. It's worth becoming a member of AUG anyway, but especially worth it for the newsletter, as it has something for everyone: C programs, Basic programs, reviews, hardware to build and literally hundreds of PD disks for sale. Check out the address at the end for further details.

There are only about five people in the country who are capable of massive computer fraud

Your letters

The first letter out of the bag gets this month's Community Spirit award. Edward L Jewasinski of AGOG Publishing sent me a note about his magazines, one on paper called AGOG, and one on disk called AGOG AGO GO. I'm not exactly sure what they do but, judging by his literature, it's worth the risk of possibly wasting the money to find out! He also raised some questions about public access to computers for creative types.

I propose a Creative Computing Centre, the purpose of which would be to introduce and encourage the technophobe artist to create new levels of excellence in this fascinating field, as well as allowing small presses access to DTP equipment and resources at cost price.

At the present time, AGOG Publishing is in the process of obtaining funds and support for this project. I would welcome ideas and suggestions from your readers, as well as more practical support.

I've always agreed to public access, Edward old bean, but trying to go national just ain't possible. Local folks could probably help out, and how about company sponsorship? Have you tried the computer companies? I'd recommend forming a co-op first, as this makes you more legit. Anyone wanting to help Ed set up his facility, or wanting to get copies of AGOG or the disk mag AGOG AGO GO, write to: Edward Leonardo Jewasinski, AGOG Publishing, 116 Eswyn Road, Tooting, London SW17 8TN. Good luck!

Gordon Keenan sent me a disk which he suspected of having a virus on it. The virus, he said, seemed to attack tracks 40-43, making the disk unusable after a time. He thought it was a new strain called HNA RQ. Under inspection from *VirusX 3.2* it turned out to be Lamer Exterminator Virus, a new and virulent strain, immune to all killers except *VirusX*. If anyone wants a copy of *VirusX 3.2*, I'll let you have one. Just send me a small Jiffy bag with your address and a 28p stamp on it, with a blank disk inside. I'll copy the program onto it and whap it back to you by next post. Address it to *Shopper*, but label it Virus Killer.

Lastly, me old mate Chris Thorpe has a question about the Silver Reed photocopier, which some manufacturers are selling as a scanner.

One advert calls it a Desktop Copier and prices it at £199, the other ad claims it to be a combined printer/scanner for the Amiga at £395. I've also seen an ad for it at £695! I went into Wildings and had a look at it. I couldn't see any sockets, but they could have been hidden from view. This has GOT to be worth checking out.

The ads are genuine enough. The 'scanner' was from Faber Electronics, the 'copier' Wildings and the expensive version was from Burocare. Has anybody got some info on this? I'll see what I can find out for the next issue.

Amiga contact file

For those of you who didn't read the last issue of *Shopper* (shame), Fred Fish has changed his address, so anyone wanting his up-to-date list of Public Domain (PD) software will have to take note of his fixed abode. If you'd like the new catalogue disk you must send a blank 3.5" disk to:

Fred Fish,
Catalog Disk Update,
1835 East Belmont Drive,
Tempe,
AZ 85284,
USA.

Include return postage money to cover two ounces of first class post or International Reply Coupons to that value. Fred will send you his freshest fillet of Fish by return of post.

17 Bit Software in Wakefield is another good source of PD and publishes a fine set of disk-based magazines for you to run in your machine. I can highly recommend its wares and the people are right friendly when you bell them up, an' all. Call Martyn on (0924) 366982 and ask for details of subscriptions.

The Amiga User Group stocks PD software, this time in Leicester, and is run by another fine bunch of lads. The group publishes a fine newsletter and sells Amiga hardware and software at reduced rates for members. It also runs its own BB service, called TABBS, on (0533) 550893 evenings and weekends. Call Yuri or Keith at Cavendish Computers on (0533) 550993 and say I sent you.

That's all folks!

That's all we've got time for this month. If you have any ideas you'd like to see in print, hints for Amiga hardware and software, or just want to drop me a line to have a rant or a chat, send your missives to:

Phil South,
Amiga Section,
Computer Shopper,
14 Rathbone Place,
London W1P 1DE.

Alternatively, you can E-Mail me at the following BBs:

Prestel: 219997854
Telecom Gold: 74:MIK2077
CIX: snouty

I'll get the message within a day or so under normal circumstances.

Phil South is a freelance writer, living in Hemel Hempstead. He is keen to point out to regular Shopper readers that his fiancee is not an Amiga called Ralph

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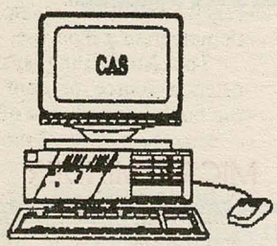

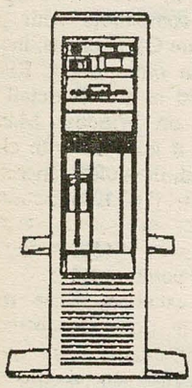

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Art for Arch's sake

by James Hope

James takes a long look at Render Bender, an art package for the Archimedes. Plus all the latest news for Archie users

BY NOW the news of the Acorn price rises will have extracted all the reactions it is likely to. At a time when just about every known computer manufacturer within this star system is reducing its prices, Acorn seems to be the only company embracing a diametric policy. Could this reflect an ever-growing confidence in the machines it produces – so damn good that it can sell them at any price? This may be the case, but I hope that Acorn is going to renew its efforts to tell the World. Alternatively, as seems more likely, this might be a device to provide Acorn with some room so that it might guard against too much price cutting.

I promised to have a look at *Arc Comm* this month. Well there's been this problem. I managed to get all of the requisite bits from the BBC, but something unmentionable happened to the disk. I'd rather not talk about it. But looking at the manual I am confident that I am going to get some good results with this software. I await another disk earnestly.

I have managed to get my preview copy of *Arch DTP* underway under Risc OS. The problem is that since I have only one Mbyte of memory (hint hint) I had to cancel just about every other operation. However, I am confident that the *DTP* will work in 1Mb, it's just that to get the thing up to a decent speed you need a bit of font cache set aside – well quite a lot actually. But with this done, I am more optimistic than ever. GST certainly seems to be doing a good job. The *Ventura* feel of the package owes much to the adoption of style sheets, as used in the widely respected MsDos page publisher *Timeworks,* and of course *Ventura.*

Style sheets are a little like macros, or procedures. Any given document has a number of styles associated with it. By style I mean text typface, pointsize, whether characters are bold, underlined or italic, the amount of space between characters and lines, and so on. All of these variables are determined by the user when they design the pages. Generally the more styles there are, the worse the document looks, but that's not the problem of the software. The great advantage of styles sheets is that once you have adopted a certain style for a particular type of text, perhaps the headline is in 20 point Times, while subheads are in 15 point Times bold, you can quickly format the text according to the type of text that it is. Also, should you decide that you really don't want to use Times for the headlines, but Helvetica because that's the kind of mood you are in, then the changes will be made automatically to every headline within the document.

So far, and remember that this is an early version of the software, the package works like a dream under Risc OS. Opening documents can be done by dragging a style sheet over the *DTP* icon on the task menu, or by double clicking a completed document. With *DTP* resident, serious users, who I would expect to be using at least 2Mb machines, will be able to flick between word processors and graphics package with ease. In this respect *Archimedes DTP* users are going to have a lot to crow about over Mac users.

And what else is new this month. Ah yes, a computerised 3D Scrabble called *Word Up Word Down.* It's being flogged by Gem Electronics for five pence short of eighteen pounds. The program includes speech synthesis which announces each letter as it is placed, and a few options which takes this most famous of word games into a new dimension – and we're not talking the third.

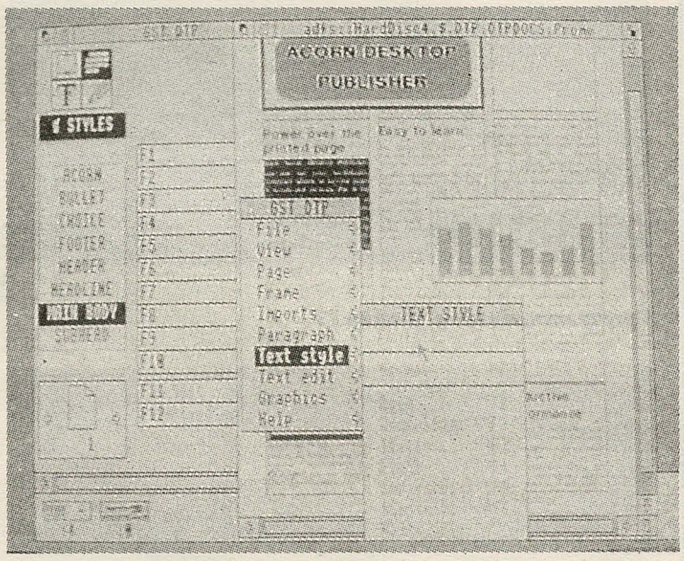
A book from Dabbs Press found its way into my hands a few weeks ago. At £14.95 Alex and Nic Van Someron's book, *Archimedes Operating System* is a first class guide to the mysteries of Archie's innards. Though the book states that it is not for beginners, since the material is highly technical, it is easy to follow and very well laid out, and I would suggest that it would be an excellent purchase for the eager beginner, since such insight into the power of the Arch would spur all but the most incurious of noviciates.

With over 300 pages, held bound by one of those wretched spiral devices, the book covers a huge variety of subjects. The history of RISC is followed by an examination of the ARM instruction set including register maps and ARM assembler command syntax. Next, the book compares BASIC and Assembler with information as to how the two might co-exist. For those wanting to sample life behind Risc OS, a detailed look at the operating system includes a full explanation of SWIs. The command line interpreter is fully explained in terms of its role within the operating system and all of the commands that are available. All operating system SWIs are discussed in the following chapter, together with an example listing demonstrating their use.

The Arch filing systems are often a source of confusion, so the book has a couple of chapters addressing them and their associated SWIs. Example listings are again provided in the chapters concerning writing modules and applications, with plenty of advice on how to keep your efforts compatible with present and future OS versions, including the soon omnipresent Risc OS, discussed in greater detail in the chapter on Window Managers. And so it goes on with chapters on sound, the voice generator and associated SWIs, a discussion on interrupts and vectors and some pretty heavy stuff on the ARM floating point model.

An excellent little number. Not only does the book offer some information not available through the normal channels, it manages to put it all across in a pleasant and intriguing manner. Highly recommended for the person who wants to know it all. As usual, if you don't fancy typing in all of the listing, you can get a disk from Dabbs.

Arch DTP



Picking points with Archimedes DTP

Render Bender

If you don't appreciate the importance of the fall of light on a picture, ask Constable; he knew a thing or two about how light could be 'manipulated' to make a scene dramatic. But Constable had to do things the hard way. He had to observe the direction from which the light came, and then make sure that the resulting shadows and reflections accorded with the light source. This can be boring and computers can do it so much better.

Render Bender is the first, though certainly not the last, software design tool which allows the user to create a scene which will accord with all the laws of physics governing reflection, shadows and refraction.

Take a simple scene, perhaps a couple of snooker balls on a table – God knows we see enough of those on telly. If you placed an angle poise lamp on the table and shone it towards the balls you would expect to see a spot of light reflected from each ball, as well as the shadows thrown by the balls (this is beginning to sound like Mad Nick Pelling's *3-D pool*, but more of that another day). Now for the exciting bit.

Continued on page 156

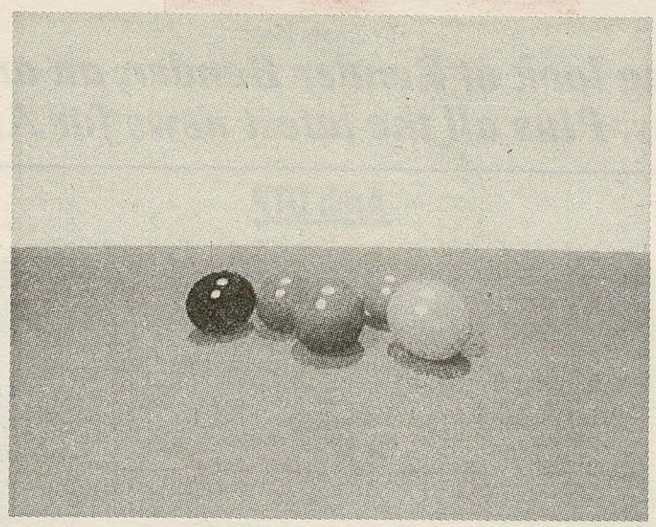
Continued from page 155

Move around the table a little and of course the reflective point on the snooker ball's surface move with you. This is basic reflection physics where, armed with the value of two of the three variables, either the position of the light source, the point of reflection or the position of the observer, it is possible to work out the third point.

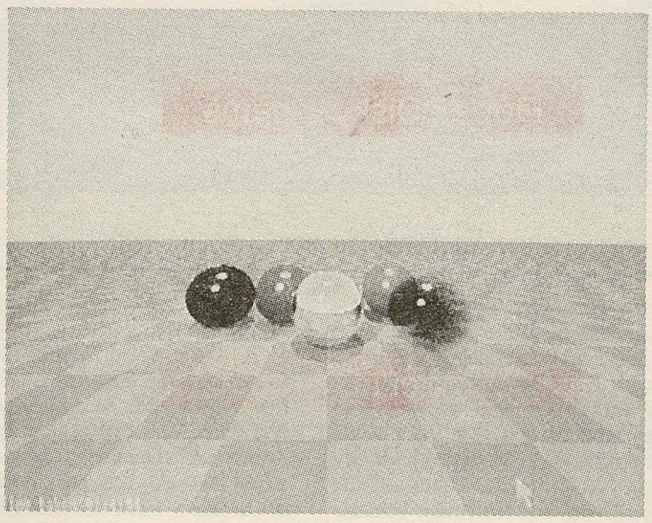
But *Render Bender* goes a little further. For example it will take into account the surface of the objects, which might be of a non-reflective matt finish, rather than smooth and shiny. Or indeed the objects could be transparent and so have refractive properties. On top of that the type of surface that the objects are standing on is influential, especially if the surfaces are transparent and the 'floor' is starkly patterned. Also, you can alter the intensity of a light source, and the opaqueness of an object.

When you take all of these visual influences into account, you begin to understand that while ray tracing may not be a particularly complex task, it certainly crunches a lot of numbers. Constable didn't actually calculate how each tiny part his of picture, pixel if you can think of a Constable that way, was influenced by the light source and the surface of the object that the light fell upon; he just observed the overall effect, and painted that. But computers being computers must take the mathematical slogging approach. By looking at each pixel in turn, and working 'back' to the object and from there to the light source, the computer can calculate the value of the pixel in terms of its colour and brightness. Ray tracing from the observer's point of view, rather than calculating the path of every ray from the light source makes sense, since you avoid having to calculate the path of light which does not fall into view. But even for this limited view, the process still takes a lot of time, though fortunately *Render Bender* incorporates a number of tricks to make the process of turning a flat and inanimate object into something which has a truly effective 3D perspective.

Render Bender



A pretty normal view as seen on TV



The felt has changed and, for the benefit of those watching in black and white, so has the red ball

The package

Render Bender has two components. The ray tracing software itself and another program to produce animation from the ray-traced screens. But the exciting stuff first.

The opening menu of *Render Bender* immediately gives the game away – this is not a graphics program in the traditional sense. If you are frightened away from 'arty' packages because you can't draw, you might feel more at ease(l) here. What we have is a sort of graphics compiler where you describe the scene you want to create in terms of the shapes of the objects, the positions of the shapes, their colours and the surfaces. Add to this the information about the position of the light source and you can build up some pretty convincing images. *Render Bender* uses text commands which are compiled to create the scene according to the instructions given.

At first this seems a strange approach, but for the impatient and artistically lacking it has a number of advantages, not least the software's ability to manage such mundane tasks as perspective. If you position two objects of the same size, but place one nearer the viewer than the other, then the size of the one furthest away is varied automatically, according to perspective. This is one of the reasons the snooker table view was so easy for me to create.

If you look at the figure 'Example of Script file', with the two listings, and compare what's left of the two snooker views you will understand how it all works. Listing one created the ordinary snooker balls on the table effect. You see what I mean about not needing to be an artist to create an effective 3D image. Let me explain how the commands work. Each of the descriptive functions like View or Light must be associated with a view point or a position. Cartesian co-ordinates provide the position. If you had problems with 3D co-ordinates at school, now is your chance to regret it. They look a little complex, but as soon as you start to experiment with the relative positions of objects, and indeed the position of the viewpoint, you start getting the hang of thinking in terms of -xs and +xs to move left and right or +ys and -ys to move up and down. The diagrams given in the manual are a great help, even if the explanations are a little short.

The two most important commands deal with the observers viewpoint and the positioning of the light. View first. A typical example would be:

VIEW, 0,40,-100, AT 0,10,0

which means that an 'eye' is positioned central with the X plane, 40 units up the Y axis and 100 units back from centre along the Z axis. The centre of the scene is positioned in the exact centre of the 'world' apart from it being 10 units up the Y axis. Since objects can be placed in any position and viewed from any position, all manner of crazy effects can be created. I could, had I been in the appropriate frame of mind, have had the snooker balls floating gently above the table, just to make the shot a little more difficult. Or indeed having them half-way embedded in the felt is rather rewarding.

Light comes in three basic styles, and you can have up to four light sources in any one composition. Lightbeam specifies a beam of light, rather like sunlight sneaking though a knot hole in wood. As always its position, direction and intensity can be numerically specified. Lightpoint lets you place a light source within the picture, so placing a light bulb into the frame with the light given off pretty diffused. Spotlight is the final type and the more complex since with this you can specify the arpature of the light, so making the circle of light on the illuminated target smaller or larger.

With the light sources set up you can scatter a few objects about. The object list offers pretty basic geometric shapes, Sphere, Pyramid, Cube, Disc, Cone, Tube and Polygons. All objects can be specified in terms of their dimensions, and all may be rotated about any axis using the rotate command.

The objects are fixed. You can make your scenes as complex or as simple as you like, but since anything you compose must be made up of these geometrical shapes, you might be a bit pushed to re-create *Early morning in Sherwood Forest*. Indeed the strength of *Render Bender*, which is that it is very easy for not artists to create interesting shapes and objects using pure mathematical descriptions, is also its weakness. Some may find the inability to input objects a scenes which have been created by a drawing or CAD program to be very limiting, and I suspect that this has much to do with the complication of ray tracing irregular surfaces.

On the plus side is *Render Bender*'s ability to export ray-

Continued on page 159

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MT130/140/280/290	FN	4.67	4.14	3.78
MCIRO P				
MP165	FN	3.14	2.72	2.46
MP165 COLOURED	FN	3.77	3.30	3.00
NEC				
P1/P2/P6	FN	4.19	3.70	3.37
P3/P7	DN	5.01	4.47	4.08
P3/P7 COLOURED	DN	6.12	5.50	5.04
P5/P5XL/P9XL	FN	4.23	3.74	3.41
P5/P5XL/P9XL COLOURED	FN	5.15	4.59	4.20
P6+/P7+	FN	AS YET UNBRANDED ONLY		
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80/82/92/93 COLOURED	FN	1.94	1.60	1.42
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5420	FN	7.73	7.00	6.44
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CP80	FN	4.55	4.03	3.68
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GEMINI 10/15 COLOURED	FN	1.94	1.60	1.42
NL10	FN	4.13	3.64	3.32
NL10 COLOURED	FN	5.78	5.18	4.75
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LC10 COLOURED	FN	3.62	3.16	2.87
RADIX 15	FN	4.52	4.00	3.65
NB24-15/NB15	DN	4.59	4.07	3.72
NB24-15/NB15 COLOURED	DN	5.60	5.01	4.59
NX15/NR15/ND15	FN	4.14	3.65	3.33
NB24-10	DN	4.13	3.64	3.32
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Continued from page 156

traced scenes to other packages by saving them as Screensaved, so you could use an art package to add some rough edges.

Once you are happy with your list of instructions you compile it – an easy enough operation. If anything is amiss, the compiler stops and returns you to the edit window with the cursor on the offending line, and a little warning message above. In reality, you will find yourself compiling relatively simple files, or at least loading one of the many examples and altering a few parameters just to see the effect, which will mean frequently jumping from the edit screen to the main screen.

It is from this main screen that you do initiate the ray trace and decide on the overall parameters, such as the colour of the sky, the texture and colour of the floor which may be altered by means of a 'floor' editing module which allows different patterns to be designed and colours used. The tools which control the floor pattern and texture are very comprehensive, allowing many thousands of different patterns to be created. The main limitation is that while you can have the floor of your whim, the selected pattern must be used for the entire floor area; you cannot mix and match. The same is true of the sky, whose colour you can choose, and the change in colour density can also be altered, but you cannot place other colours or patterns in the sky – like clouds and other such things.

The amount of time it takes to produce the screen depends on the screen area being used. A full screen with shadows on, and all at high resolution can take a couple of hours. But to make composition easier, Clares has provided a number of switches to turn non-essential items, like shadows, off, and have the area ray-traced as small as 128th of the screen. Mostly you will use a 16th of the screen, since thumb nails of this size are reasonably quick to produce, and large enough for you to work out what you did wrong from.

The adopted text system is neat and pretty effective, but I can't decide if its limitations are serious. Silicon Vision is due to release a ray tracing package soon, but its system allows objects to be imported from *SolidCAD*, so it relies more on the traditional drawing approach. With any luck I might be able to get a review in next month, although, to be perfectly honest, from a journalist's point of view, I have found the brothers at Silicon Vision to be anything but forthcoming. Perhaps they treat their customers better. We shall see.

But before we finish I should make some mention of the animator which brings your 3D ideas to life. Easy to use and very efficient, the Animator simply links together a series of ray-traced pictures to create the illusion of movement, cartoon-style. What really happens is that once you have supplied the list of screens to be animated, the compiler compares each screen with the next to find out the difference, and then only that data is used. A neat form of compaction and one which allows fast and smooth sequences without using acres of disk. The compiler can also be used for animating other sequences of pictures saved in uncompressed format in mode 13 or 15. And is if all of this wasn't enough, there exists plenty of help and the necessary magic for those who want to incorporate all of this 3D art into Basic programs. Examples are given.

With a few reservations, this is an excellent package. The software works faultlessly and it offers plenty of scope for letting the imagination run wild. One thing which I would like to have seen would be some means of creating composite objects, procedures if you like. It would have been nice to have described an object made from a number of carefully-placed geometric shapes, and then have been able to group all of them as one. This way users could build up libraries of composite objects, and apply the positioning data to just one name, rather than a whole string of objects. The text approach is a boon for the non-artist, but object linking would have added a great deal more flexibility.

Also I am bound to say that I find *Render Bender* a touch expensive; not for the way it performs, you understand, more for what it does. If you don't mind spending 70 quid for some pretty absorbing graphics work, then fine, you won't be disappointed. The software lives up to all of the claims made for it. And who knows, some imaginative teachers might employ it to help maths pupils think in 3D, a more interesting method of mastering Cartesian co-ordinates I cannot imagine.

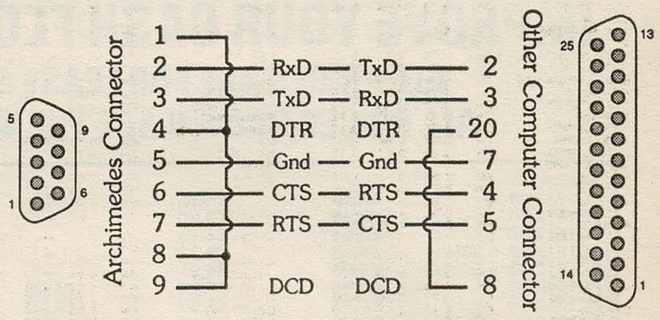
Example of Script file

```
/set up viewing position

view,0,100,-200,at,0,90,0

/set up lights

lightbeam,1,0,-1,0

lightpoint,1,-120,265,-240

SPHERE, :SHINY,:RED, 0,35,0,35
SPHERE, :SHINY,:RED, 0,35,0,35
SPHERE, :SHINY,:BLUE, 0,35,0,35
SPHERE, :SHINY,:BLACK, 0,35,0,35
SPHERE, :SHINY,:WHITE, 0,35,0,35

These lines were changed to get the second view

SPHERE, :MIRROR,:METAL, 0,35,0,35
SPHERE, :SHINY,:RED, 0,35,0,35
SPHERE, :SHINY,:BLUE, 0,35,0,35
SPHERE, :SHINY,:BLACK, 0,35,0,35
SPHERE, :SHINY,:GLASS, 0,35,0,35

And that's how two snooker balls were transformed into a great big ball bearing and a crystal ball. The change in the floor pattern is effected from the main menu, rather than being a command used by the compiler.
```

PC To Arch and back

A letter. Great Scott! Bob Pendleton of Somerset hit upon the idea of using Amstrad's *Linkmaster* software to effect file transfer between his Arch and (I suppose his) Amstrad 1512. Naturally he was running the software under the Dos emulator on the Arch and reports that all seems well, except that the two machines won't talk – and that this isn't snobbery. The problem, and I think you might have spotted it, is that the Arch uses the more recent serial standard, RS423, while the Amstrad is still on the more traditional RS232, and I suspect that the cable you have is wired as a 9-pin AT serial connector, which is not necessarily the same thing. At the Arch connector you should have pins 1,4,8 and 9 connected together. At the PC end you should connect pins 20 and 8 together. Now, between the two connectors Arch pin 2 to PC pin 2, pin 3 to 3, 5 to 7, 6 to 4, and 7 to 5 on the PC. This probably sounds quite the reverse of what you might have been told, but remember that the Arch has a different pin out than does the 9-pin IBM connector. If this doesn't do the trick connect pin 6 and 4 at the Arch end and leave 7 unconnected. Ah, serial cables are such a laugh.

A couple of points worth bearing in mind here. Firstly, unless you have a lot of files to transfer, you should find that MsDos provides perfectly adequate transfers between two Dos environments. I know it sounds cheapskate, but why fork out cash when you don't need to, especially for rubbish like *Linkmaster*. Look up file redirection associated with the copy command. Alternatively, and this is better even if you do have lots of files to move, install some decent comms software at each end. Perhaps *Transend* or *Mirror III* at the PC end, and *ArcComm* for the Arch. A combination of these two products will cost more than *LinkMaster*, but at least when the day comes and you buy a Hayes modem you will have the software to go on line from whichever computer you prefer. See you in a month.



Contact

Arcom: £49.95 BBC Soft, (01) 5762 539.

Archimedes Operating System: £14.95 Dabbs Press. (061) 766 8423.

Render Bender £79 Clares (0606) 48511

Transend PC: £49.95 Messiter Software (01) 449 2994

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Portabilia

by Jeremy Spencer

The start of Shopper's new column devoted to pocket computers, and that strangely enough will include the Z88

TO CELEBRATE the start of our new section, Psion announced the launch of two new Organisers. How Kind. However for this first issue space is very limited, so I won't restate what has already been covered in the news, except to say that the rumour that Psion is working on a new PC compatible is growing ever stronger. I, for one, hope that it doesn't take this route, it really isn't the right direction. Psion, of all people, should know that. Which reminds me, where's the Atari hand held, after all the fuss of the launch? Expect a full review of the new Organisers next issue, although the PR agents tell me that they won't send me one until I have returned a few other bits of theirs. Never mind, it was worth a try.

Psion

In the bag this month we have two programs, a database and a utility. Sadly space only allows me to review one, and anyway I really need to talk to the author of the database. I seem to have lost your phone number, could you give me a ring?

I looked in detail at a program called *Convert* which offers just about every conversion factor you can imagine. The software comes in two versions, both costing £29.99. The difference being that one is copy-protected and comes with a 30-day money back guarantee, while the second can be copied to 128k dp, but gets no guarantee, money back or otherwise.

A long and tedious description of exactly what this software converts seems unavoidable, but rather than cite every case I will cover the main areas with some details to give you an idea of the scope. Currency was a must, the Dollar, Mark, Pound, Lire, Franc and Yen are built-in, but you can add your own to the database and naturally update existing values. Only one base currency is used, but that shouldn't be a problem. Length option includes international nautical miles and miles. Standard measures are great aren't they, I bet you didn't even know that UK Nmiles were different to anybody else's. Area, volume and weight covers all of the imperial measures and metric scales with a few US standards thrown in. Temperature converts between Fahrenheit, centigrade and Kelvin.

Time is a strange one. It allows you to find the number of sub units within a given unit. You might remember the fun some used to derive at school working out how many seconds it was until the end of term. Now such chores can be performed in a split second, simply by putting in the number of months or weeks to go. If you don't know the number of weeks then you can enter the start date and end date and *Convert* will work out how many seconds there are between the two, or how many weekend days or working days for that matter.

Further date functions are provided under a Date menu. Here you can enter two dates and be told the number of days between them, you can even specify the days you want to exclude, perhaps to get the number of Mondays and Thursdays between two dates. Also, by entering a date and a number of days or whatever, you can find out the finishing date. Other time/date related functions, though again under separate headings, include a function to reveal a person's sun sign or the exact date of Easter for any given year. No forward planning priest should be without one.

Energy covers foot pounds, BTus, therms, joules and kilowatts and calories. Angles is easy, just degree and radians. Power lets you convert between horsepower, watts, foot pounds per second and BTus per hour. My car turns out 123,040 Watts which I suppose translates into 123 one bar electric fires, a unit not provided. A shame since that's just the very unit most government departments seem to dole out.

Pressure covers pounds per square inch, tons per square inch, Pascal, inches of mercury and atmospheres to name but half. Numbers is interesting. Apart from the mundane conversions between decimal, hex and binary you can convert between Roman numerals and any number base you chose. What's more, the software also acts as a look up table for ASCII characters, albeit just those from 33 to 127.

And finally, and this might even be a must for the travel-weary, although I suspect that most jet setters are already aware of their duty free allowance. Yes, you guessed it. A how-much-can I-get-away-with calculator which takes the form of a questionnaire to determine if you're bringing in goods from within or without the EC and precisely what quantities of each type of contraband you hope to get away with. The annoying thing about this function is that it just tells you only that duty is payable if you exceed the limit for any item. If you want to work out what your entitlement is then it must be by trial and error. I forgive it though. The questionnaire always ends with the line MORE ALCOHOL (Y/N). I placed my Psion over the ever empty glass and pressed DEFINITELY, but nothing happened.

Now this is all very comprehensive, but what else can it do? Well one feature which may add some extra appeal is the Combine command which allows multiple conversions to be performed. Instead of only being able to work out the equivalent price of a lump of cheese in France, so the example goes, you can compare prices by being able to convert between Pounds per pound and Francs per kilo. I agree that this could be pretty powerful in the right hands, but I would like to have seen some sort of facility for storing combined conversions, like macros, so reducing the number of keystrokes for commonly performed operations.

Quite correctly the covering letter states that the software offers a number of features currently available from other programs, such as the Travel Pack. However, nothing else is as comprehensive, and this software has, but for a couple of small points, been well designed so that it is quick and easy to use. Converting between binary and decimal was certainly easier using Convert than my trusty Casio FX 450. But, why don't currency conversions, and a few other conversions, get rounded down to sensible figures. I really don't want to calculate Francs to XII decimal places. And why doesn't this comprehensive list of conversions include velocity. I suppose you could convert from miles per hour to inches per second using combine, it just seemed like a more sensible way of filling spare bytes compared to the non-dispensing duty free guide.

TIPS PLEASE

If you have any hints, tips or programs for any hand computer, which includes the Z88, then please write to Portabilia at *Shopper*

Agenda

The delay of a developer's kit has inevitably held up the release of applications for this machine. Having said that, bits and pieces are beginning to appear, either written by the Microwriter team, or those very close to their bosom. The French translator will be the first mass market Microwriter product to appear, sometime late June. I'm going to Le Mans to test it, along with the IQ's equivalent.

But out now we have *Quinkey*, which is a utility to link the Agenda into an IBM PC's, or like looking thing, keyboard. The utility works as a resident module at each end. Once loaded into an Agenda it stays there, being called up with 8 from the start menu. The PC TSR naturally maps all signals from the serial port as if they were keystrokes. I tried the program with a host of PC bits and it works well. All but a couple of PC keys are mapped, so the system seems ideal for those who can only use an Agenda as an input device.

The other product is the equivalent of Agenda's PC Backup, with a few more bells. Not only does it allow you to back up an Agenda to a Mac, but it will allow individual files to be transferred, formatted to, or from, programs like *MacWrite*, *Acta*, *Affinifile* and *Hypercard*. The *Hypercard* toolkit allows data to be formatted for stacks so that the Agenda can be used as a portable *Hypercard* input system. For on-the-move text work full use can be made of the formatting posts. The software permits macros and complex commands to set up text and point sizes. Finally the software does the same job as *Quinkey* above, but for a Mac of course.

Contact

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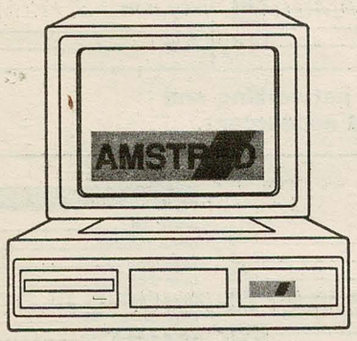

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Building a brain

by Mike James

In the search for the thinking machine we may attempt to build a model of the human brain. A harder task you may never encounter

NEURAL networks are fast becoming the most important topic in advanced computing since expert systems first appeared. Machines based on neural networks that can be taught to recognise patterns and perform many other computations are now available and it's only a matter of time before they become commonplace.

Expert systems were, until recently, the hottest topic in AI, but there are signs that there is a new star rising. Surprisingly, the newcomer isn't really a newcomer at all. Implementing neural networks – roughly speaking, the building of models of the brain – is one of the oldest approaches to AI.

It may be old, but until recently it hasn't produced any results worth talking about. Indeed, the whole approach has, in the past, been discredited more than once, and it was a brave computer scientist who risked a future career on the obviously crazy scheme of building a brain! Even so, many pioneers did make some small progress on the problem. The slow rate of progress shouldn't be surprising for a project of this magnitude. Endeavours such as going to the moon, unravelling the human gene or building the first fusion reactor are small fry compared with understanding the way that the brain works. However, it may not be necessary to understand the brain completely to produce a working copy.

The alien brain

Suppose an alien space capsule landed on the earth and, when it was opened, it was found to contain a machine that would convert raw energy into any object we desired. Such an important machine would definitely be worth duplicating if only we knew how, but the theory of its operation would be well beyond our current understanding. Instead of taking the round-about route of trying to build a theory of how it works, a quicker method of duplicating it might be to replicate exactly each of its components and then assemble a copy.

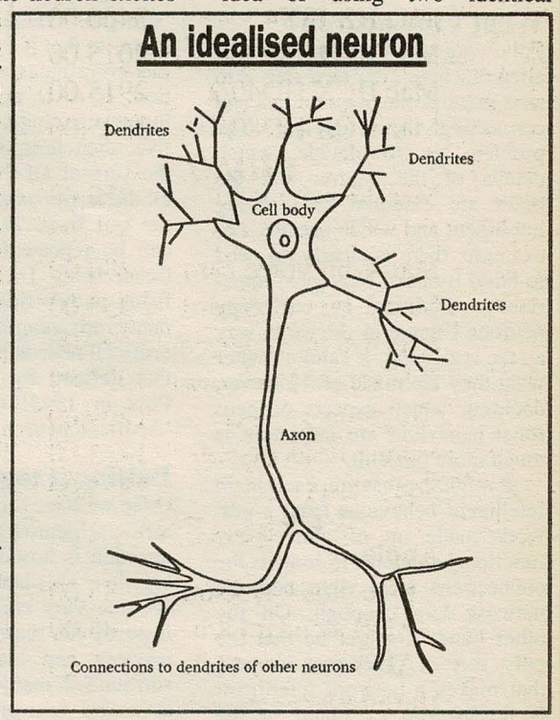
You can imagine the moment of switch-on – of course it wouldn't work, because some apparently irrelevant but actually essential feature of the original would be overlooked. However, the effort wouldn't be completely wasted because at least you would know that something was missing and you could look at the original more carefully in an effort to find out what it was. The chances of producing a perfect working machine would be good, as long as the technology developed sufficiently to perfect the copying process. At the end of the day, you would have the machine and the technology to produce copies, but no complete or adequate theory of how it worked!

Look no brain

If you repeat the alien machine argument on the brain, you will be able to see that what we have to do is design an artificial neuron and then connect them together to form an artificial brain. Simple! Well, not really. The neuron isn't too difficult to simulate, but it is the sheer scale of the operation that makes the entire project difficult. The basic building blocks of conventional computers have, at most, tens of inputs and outputs. A typical neuron has between 5,000 and 60,000 connections! A computer may consist of tens of thousands of basic gates but the human brain has over 1000,000,000,000 neurons. To make things worse, neurons may have more than one way of communicating with each other. The main, and best understood, method of communication is electrical.

An idealised neuron seems almost familiar to a computer engineer. It has a collection of inputs called dendrites which concentrate on a cell body. A single output, the axon, carries the signal to the dendrites of other neurons. A neuron fires, that is, it produces an output pulse, when the sum of its inputs, the membrane potential, exceeds a certain threshold. There are also two sorts of connection between neurons – inhibitory, which reduce the membrane potential and excitatory, which increase the membrane potential. (See the figure 'An idealised neuron'.)

This 'fire' or 'no-fire' sounds very much like the binary on/off states the basic gates within in a computer use, but that's where the similarity ends. The fact that the inputs to a neuron have to exceed a given threshold before it fires makes it a very different device from the sort of gate with which we build computers. Real neurons also have a number of 'living' characteristics. For example, they get tired! To be more precise, a recovery period is needed after a neuron has fired before it can fire again. They also seem to affect one another in ways that are very similar to hormonal control. In other words, the way that one neuron excites another can alter its metabolism for a period well after the excitement is over. All in all, neurons are very complex and our knowledge of the way that they behave and the way that they work is far from complete.



If neurons are a mystery, then the brain is even more so. Unravelling the workings of something built of so many basic units has to be difficult. If you have seen a model head with different sections marked with their purpose – the emotions they are responsible for etc – or even an anatomical model of the brain marked up in the same way, and believe that this is the level of understanding that we have achieved, I have to tell you now that this is mostly invention. The true state of our knowledge of what the brain does is that we have identified major anatomical areas – areas that look different – and have some, often vague, idea of what they are for.

We know which areas are responsible for vision, controlling the limbs etc. The amount that we don't know is much larger and some of the omissions are very serious. For example, we know that the brain is symmetrical and divided into a left and right hemisphere which look more or less identical. We know that one of the hemispheres is always dominant, ie it does most of the day-to-day running of things.

In right-handers it is the left hemisphere that is dominant and in left-handers it is the right. There is also some suggestion that the left hemisphere is concerned with verbal and logical thinking, and the right with intuition and creativity. This duplication and division of tasks seems very neat and it is a pleasing pattern – especially so to an engineer. It looks like the familiar idea of using two identical machines to ensure redundancy – but it isn't. There are many obvious contradictions in this neat pattern. For example, if the two hemispheres deal with different tasks then their purpose cannot be to introduce redundancy, but then why are they more or less identical? The neat pattern of brain symmetry may be pleasing but, at the moment at least, we have no idea if it is an essential feature of an intelligent machine or an artifact of evolution. In short we haven't a clue!

Although we don't know very much about the overall wiring of the brain, we are at last starting to unravel smaller sections that do specific tasks. For example, a great deal is known about the way the signals pass and are processed from the retina at the back of the eye through the optic nerve and then on to the optic regions of the brain. It is known which areas detect particular basic features such as lines and edges at particular angles, but this is a long way from understanding how we see the individual objects that make up a scene.

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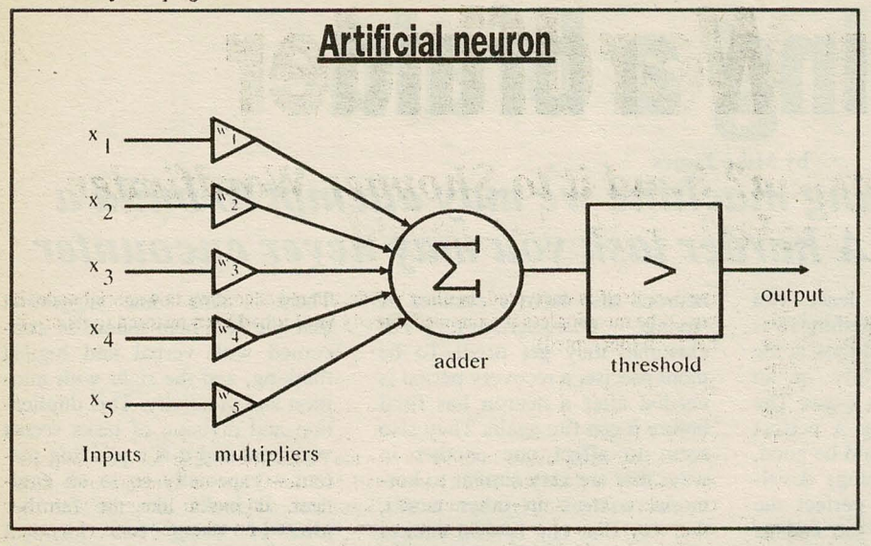


What's my neuron?

Following the 'method of the alien machine', our next step is to start mass-producing neurons and connecting them together. The problem is to decide which details of the neuron and the brain are essential to it being intelligent and which are not. For example, there is clearly no need to build it out of biological materials – as long as our copy neurons behave in the same way as the real thing, it cannot matter what they are made of. However, deciding which aspects of neuronal behaviour are important is much more difficult.

It might be that you can obtain intelligent behaviour from a network made up of almost any functional elements as long as the connections were right and the network large enough. On the other hand, it might be that the only sort of functional element that makes a network intelligent is the neuron as found in the human brain.

The real question is: does intelligence arise from the way neurons are connected, ie the network, or is it some essential property of the neurons themselves? The answer probably lies somewhere between these two extremes in that there is likely to be a range of functional neuron-like elements that can produce intelligent behaviour.

For this reason many workers have investigated networks using elements that really don't have much similarity to a neuron. For example, so-called Boolean networks are built from standard logic gates and, believe it or not, they do learn from experience.

Even though there has been some success with building networks from simple logic elements, most researchers have tried to come closer to the workings of a real neuron. For example, a typical artificial neuron will take account of the way that each connection affects the neuron to a different extent.

The easiest way of doing this is to introduce a 'weight or 'strength' value, w, for each input, so that if the input is x then this contributes wx to its excitation. If w is positive, then the input is excitatory; if it is negative, then it is inhibitory. When the sum of all the wx values on all the inputs exceeds a threshold, the cell fires. The cells' outputs can be represented as the usual 0=not firing 1=firing but -1=not firing and 1=firing have a great many advantages. This type of artificial neuron is very similar to that defined by McCulloch and Pitts in 1943! (See the figure 'Artificial neuron'.)

Putting it together

Once we have settled on a type of artificial neuron to use, the next question is how to connect them together. This is where things can become very complicated and it is partly the reason for the air of mystery and black magic that surrounded many early attempts at neural networks. A standard approach is to connect the neurons together in layers and then arrange for feedforward and feedback connections between the layers. (See the figure 'Typical neural net'.)

Inputs to the network cause cells to fire, which in turn cause other cells to fire, and so on. The feedback connections mean that even if the inputs do not change, the network may never settle down. Such networks are very difficult to analyse and understand in operation. Researchers constructed such networks and attempted to draw conclusions from their behaviour, but it was all very vague and it was difficult to know what had been achieved.

To simplify matters, a researcher called Rosenblatt invented a particularly straightforward type of neural network that was essentially an artificial retina. It had photocell inputs and its artificial neuron was called a perceptron.

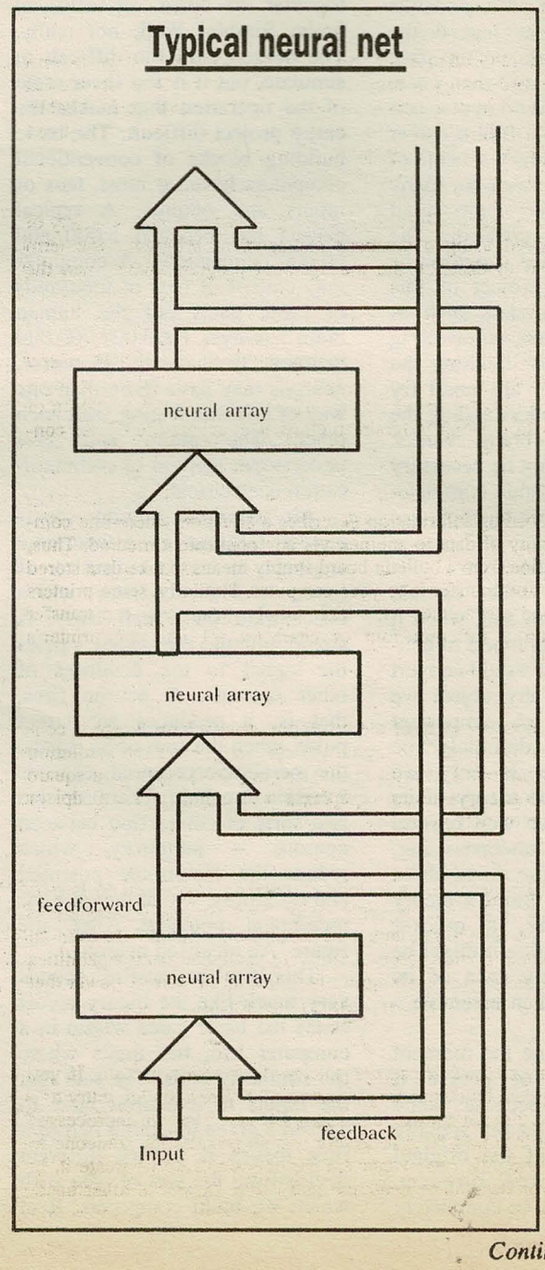
The perceptron was a simple beast, but it could be successfully trained to recognise different patterns and so it was seen to work. Many excessive claims were made for the perceptron as a universal type of neuron and pattern recognition machine and all looked good for neural computing until the book *Perceptrons: An introduction to computational geometry* by Minsky and Papert was published. This proved conclusively that the perceptron wasn't a universal device because there were some very simple problems that it couldn't solve. For example, there is no way that a perceptron can ever recognise the difference between a pattern in which one object surrounds another object and one in which this is not the case.

In other words, a perceptron, or even a collection of perceptrons as big as you like, cannot learn the concept 'surrounded by'. As the human brain can clearly learn the concept 'surrounded by', a perceptron network is equally clearly not the stuff that brains are made of. So died the perceptron and very nearly the whole of the research work on neural networks of all types along with it.

The interesting thing is that Minsky and Papert were quite correct in their analysis, but it only took a small change to the design of the perceptron to overcome the problem. All that was needed was an extension to a more sophisticated artificial neuron and the introduction of multiple layers of neurons. Why nobody shrugged off their criticism at the time is a mystery to me, but it took nearly 15 years for neural network research to get going again!

The Hopfield network

Surprisingly, the biggest breakthrough and cause of the network revival, came when, in 1982, Hopfield suggested another simple type of network. In Hopfield's network, all the neurons are connected together and there are no direct inputs or outputs to the outside world. If there are no external inputs or outputs, what good is such a network? The answer is that the input is taken to be the initial state of the network and the output is taken to be the final state of the network after it has settled down. In other words, you use a Hopfield network by setting it to an initial state (the input) and then letting it evolve towards a final state, which is the output.



As will be described in detail next month, a Hopfield network can be made to store a set of patterns by a learning process. If an incomplete or distorted version of one of the patterns is used as an input to the network – ie used as the initial state – then the network will evolve towards the original complete and undistorted pattern. You should be able to see that a Hopfield network is an associative

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Shopper Wordfinder

Flummoxed by computer jargon? Send it to Shopper Wordfinder and we'll try to make it more intelligible

Cache memory
Cache memory is a portion of your computer's memory that is designated, logically enough, for cacheing. Cacheing is a technique used to speed up data access times between various storage devices, whereby data is actually written temporarily to an area of memory and only transferred to the storage device at periods of low activity or when the memory cache becomes full. Because the time taken to write to memory is only a fraction of the time taken to write to the storage device, apparent operation is greatly increased.

CAD
CAD is an abbreviation for Computer Aided Design – usually used by design engineers to create a computerised image of the item they are trying to design – whether it is an architect designing a house or a electronic engineer designing a new computer. Having created the basic article, CAD techniques then allow the article's performance to be assessed under various simulated conditions, and the effectiveness of the design analysed, before expensive models are made of the real thing.

Capacitor
A capacitor is an electronic component whose job in life is to store electric charge. This can be useful in a variety of ways, typical examples including timing circuits, where the constancy of the time taken for the charge to leak away from the capacitor is utilised, and memory devices where the ability of a capacitor to store a charge can be used to represent the presence (or absence) of data.

CD-ROM
One of the more recent developments in the area of storage media is the advent of the CD-ROM. This technology is based on the familiar compact discs used in the record industry, which have a high data capacity and are extremely reliable. Because the data is actually etched onto the surface of a compact disc, it can only be written to once, hence the designation of Read Only Media.

Database
A store of information which can be manipulated and reported on in a variety of ways – this is achieved using a database management program. The term database is often used to describe the management program rather than the information itself.

Device driver
A piece of software written specifically to control the operation of a peripheral or storage device. The driver may take the form of a program that is run separately, a section of code that is added into the operating system or a section of code that is added to an existing program to allow it to access the device concerned.

Download
The process of downloading information describes a situation where one computer transfers a quantity of data to another, via any convenient method. Thus, downloading information from a bulletin board simply means to take data stored on the bulletin board and transfer it to your computer. Similarly, some printers allow you to download a character set, which simply means you can transfer information describing a different font or character set into the printer's memory.

DPI
This is a measure, in dots per inch, of the resolution at which an image is constructed on a particular medium. The higher the dpi, the greater the resolution used. Typically, laser printers can print at 300 dpi or 90,000 dots in a square inch, whereas professional typesetting equipment will output at 1,200 dpi or 1,440,000 dots in a square inch.

DTP
Desktop publishing. This describes a technique whereby page makeup is performed on a micro. Applications of DTP range from simple production of posters or leaflets to the design and layout of a complete manual – or even an issue of *Shopper*. There is a wide range of software available, with capabilities starting from the very basic and finishing not far short of the sort of power that used to be available only on dedicated typesetting equipment.

Encryption
Encryption is a technique used to prevent unauthorised access to data. If you simply protect textual data by demanding a password before allowing entry to a program, it is possible that the data is stored in a file in a 'raw' or unprocessed format. In such cases it would be a relatively simple process for someone to examine the data file directly, rather than via the program used to create it, in which case the password would be rendered ineffective. If, on the other hand, the data itself is encrypted, in other words, altered according to a special code, it would be meaningless if examined directly until it had been restored to its original form (decrypted).

Expansion slot
Most computer manufacturers recognise the fact that the basic system design that they produce does not cater for the diverse and obscure applications required by many users. In order to provide flexibility to cater for these requirements, they include the facility to install additional bits of hardware into their computers. The simplest system to allow these add-ons to integrate with the computer is that of expansion slots, where each add-on takes the form of a standard-sized card which fits into one of the slots.

Expert system
An expert system is a computer program that uses various techniques to arrive at an 'expert' decision when given a series of facts. Examples of this kind of program include fault-finding programs used by electrical engineers, which provide a fault diagnosis based on the conditions recorded at various points in the circuit. The programs effectively make a series of decisions such as: 'IF this condition is true THEN this section is correct (or incorrect)'. The rules used to make these decisions are pre-defined – presumably by an expert! Special programs are available to simplify the creation of an expert system – these are called expert system shells.

Flatbed
Traditional printer techniques all rely on the advancement of the paper past the print head to create an image on a full page. Flatbed printers, however, leave the page in one flat position and move the printhead over the entire page area. Because the paper itself is not moved, more precise control is achievable over the location of any particular dot on the page. This technique is also used in plotters and scanners because of the improved control.

Footprint
A computer's footprint is the area that the base of the computer takes up, and is reckoned to be a measure of how easy it is to keep one on your desk – the smaller the footprint, the more room you've got to put your coffee down.

Fourth generation language
A fourth generation language, or 4GL if you're into jargon, is a language in which the writing of the program is largely handled internally – the language itself is used simply to define the requirements of the program. The intention of such systems is that they require no programming skills to operate, but may be used by anyone with a thorough understanding of the problem to be solved.

Graphical interface
In the early days, computers weren't generally reckoned to be the easiest things to get on with (they still aren't). One of the aims of a programmer is to continually make their programs easier to use and understand. Probably the most common way of achieving this recently has been to use a graphical interface. The term 'interface' indicates that it is intended to act as a buffer between the complications of the workings of the program and the poor unsuspecting user, whereas 'graphical' indicates that this is achieved using a series of visual representations, usually controlled by using a mouse. This reduces the input required from the keyboard, making it simpler and more 'friendly' to use.

Grey scale
A grey scale is a method of representing colour information on a black and white screen – instead of displaying pixels as black or white, they may be specified to be in a position between the two, or at a particular grey level. The number of progressive stages between black and white in any grey scale may range typically from 16 to 256.

High level language
The distinction between a high level and low level language, lies in its familiarity with the operation of the 'guts' of the computer. With a high level language, you are using a pre-defined set of functions and you are not interested in the mechanics of how the funcion is actually implemented on the computer. A low level language, on the other hand, requires that you instruct the hardware directly – the only way to use a function is to design one yourself.

Nanosecond
This is a very small unit of time. It represents 1x10e-9 seconds – the sort of order of magnitude that restricts its use to those concerned with the critical hardware timing elements of a computer. Don't blink or you'll miss it.

OS/2
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Continued on page 171

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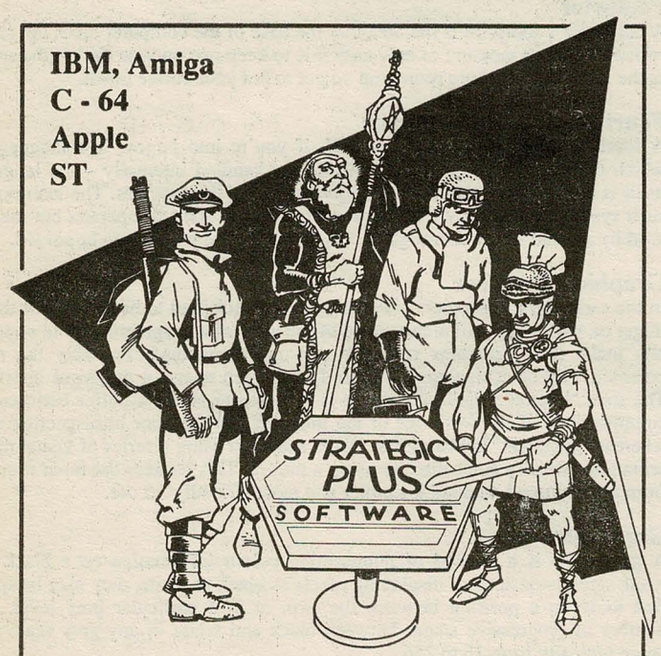

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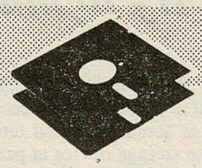

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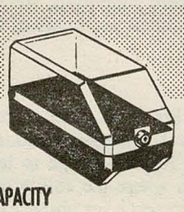

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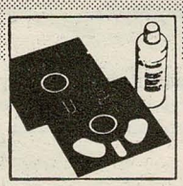

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COMPUTEC

Continued from page 169

provide full multitasking capabilities to the programmer, with priority assignments allowed for each task. Unlike concurrent Dos, the individual tasks can communicate with each other, giving the opportunity of creating tasks that are interdependent. The system comes with a graphical user interface and overcomes the Dos memory limitation of 640K, allowing direct access to up to 16Mb of RAM. OS/2 will run certain Dos applications without modification, but requires a minimum of an 80286 processor.

PS/2

This is a new range of PCs, recently introduced by IBM. These computers are all capable of running MsDos, and the model releases 50 and above are designed to the new MCA (micro-channel architecture) standard, offering high internal data transfer rates.

Pascal

A high level language that is generally considered to be amongst the most rigorously structured, thereby requiring the most disciplined approach to programming. It is named after Blaise Pascal, who is accredited with having developed the world's first mechanical calculator – the saviour of auditors everywhere.

Prolog

Another high level programming language, used extensively in the fields of Artifical Intelligence and expert systems. The name is an acronym for PROgramming in LOGic.

Real-time animation

For anything simulated to happen in real time, it must be reproduced at the same speed as it would in reality. Hence, real-time animation is a term used to describe graphics that are reproduced sufficiently quickly that it appears that they are in a continuous sequence at the required speed – a sort of TV display created on a monitor.

Risc

Reduced Instruction Set Computer. To the uninitiated this might seem like a backward step in technology. After many years where microprocessor designers have struggled to pile more and more power into their chips, a new breed of microprocessors has been brought out with only minimal instruction sets. The advantage is that they execute the instructions extremely quickly.

SIMM

Single in-line Memory Module. Whereas normal memory chips are designed consistently with standard ICs, in other words, little black packs with a row of metal legs down either side, a SIMM is designed to have only a single row of pins. If a SIMM and a standard RAM chip have the same memory capacity, it follows that in a given area you could physically install more SIMMs than RAM chips. SIMMs are more expensive than their chip counterparts and are therefore used where space is at a premium and money is no object!

Spreadsheet

A spreadsheet is a type of application program which is used primarily for mathematical manipulation. Originally, this was directed at the world of accounting for simplifying cross-casting and the likes. This was then extended to budgeting and forecasting, engineering and statistical applications. The more recent brand of spreadsheet programs are incredibly flexible and some even have in-built database facilities. The most famous example of this type of program is *Lotus 1-2-3*.

Terminal emulator

A piece of software that allows a computer to emulate a dumb-terminal, which is simply a screen and a keyboard which has no inherent computing power. Such terminals are used on mainframes and minicomputers. There are numerous different standards for the control codes used by these terminals, with VT52, ANSI and TeleVideo being amongst the most common.

TSR

TSR stands for terminate and stay resident – this is another name for memory-resident software, which will remain dormant in memory until invoked, when it will take over operation from the foreground program until it is relegated back to its dormant status. Examples of programs that operate TSR include PopUp diaries and calculators.

UPS

An uninterruptable power supply, which is a device that is designed to ensure that you have a continuous supply of mains power to your computer. If a power-cut happened to occur when you were in the middle of processing your year-end accounts, there is a fair chance that you would lose a large portion (possibly all) of your data. Installing a UPS would eliminate the possibility of such events and thereby protect your data.

Zero wait state

The design of some computers means that the microprocessor chip is not allowed access to the memory chips at all times, but must wait until the memory is available to the microprocessor chip. In order to achieve this, the microprocessor is made to execute what are called wait states, during which time the processor is effectively idle. Because of this, a processor that is apparently running at a high clock speed may not outperform one that is running at a lower speed if the slower one is not subjected to this memory access restriction – or has zero wait states. A computer that operates with zero wait states will therefore operate faster than one which does not but otherwise has an identical specification.

Continued from page 168

memory, in that it can learn and recall patterns.

Hotfield?

At this point you might still be wondering what the advantage of the Hopfield network is and why it caused so much fuss. The answer is that we can make a start on analysing and understanding its behaviour and it can be used as an associative memory. There is a curious connection between the Hopfield network and something studied in statistical physics – an Ising spin glass. Statistical physics studies the behaviour of large groups of particles in terms of their statistical distributions. In other words, it cannot tell you where each particle is, but it can tell you the bulk properties of temperature, energy distribution and so on.

An Ising spin glass is just such a collection of particles, but with the added complication that they are magnetic (because they are spinning) and hence interact with one another. Now this sounds a little like the collection of neurons all interacting with one another that we find in the Hopfield network and, indeed, the mathematics of the Ising spin glass do apply to the Hopfield network. This is very useful because it allows us to predict many properties of a Hopfield network, but it can be disconcerting because there is a tendency to use the same terminology – hence network temperature, energy, entropy etc. If you don't see the connection then you might find the use of such terms bizzare in the extreme!

The really interesting thing is that viewing neural networks from the point of view of statistical physics gives you many insights into what is going on. It turns out that when the network learns, it undergoes a 'phase change' – comparable to the change from a gas to a liquid state. The more difficult a pattern is to learn, the higher the transition temperature, ie the temperature at which the phase change occurs. You can even go on to alter the way the network works to include some random noise that depends on the temperature. (If you know a little physics then you will recall that the higher the temperature, the more random motion the particles have). This gives rise to a whole new set of methods and algorithms, the so-called Boltzmann machines, and simulated annealing methods.

It may seem a strange thing to do, adding random noise to a neural network, but it does improve the power of the system rather than decrease it. In general, these techniques are very powerful and enable us to solve diverse problems such as the travelling salesman problem, scheduling, routing, code breaking etc. Many of these problems are known in the jargon as 'NP complete', which roughly means that the time taken to compute an exact solution grows so fast with the size of the problem that they are effectively insoluble. The simulated annealing method cannot guarantee to give you the correct answer to these problems, but it can give an answer that will be correct to a given probability. For example, in the travelling salesman case, it might give you a route between a group of towns which it claims to be the shortest with a probability of .9 or .99 or .999. The longer you can wait for an answer, the better the probability of it being correct.

The whole area of Boltzmann machines and simulated annealing is fascinating, but it starts to take us away from the subject of neural networks. What is important is that since the Hopfield network and the success of statistical physics at explaining its behaviour, researchers have turned thier attention to analysing other networks in the same sort of way. The results so far are giving us many insights into the workings of the brain and helping us to design better neural networks. It seems strange that the physics of collections of particles should give us so much understanding of the way intelligent systems work, but it's true, and because of it, it looks as though neural networks are in for a boom time.

Next Month

In the AI piece next month we will look at a program that simulates a neural memory network.

Further reading

If you would like some further reading on neural networks then try *Neural Computing Architectures*, edited by Igor Aleksander, published by North Oxford Academic Publishers, ISBN 0-946536-47-3. It's a collection of readings, not all of which are up to the same standard, and as long as you feel happy about skipping any maths that you don't follow and the boring bits then it will give you an idea of the sort of thing that neural networks can do. If you do like the maths, however, you could try *Simulated Annealing and Boltzmann Machines* by Aarts and Korst, published by Wiley, ISBN 0-471-92146-7. This will give you a good grounding in the theory of optimisation by annealing and Boltzmann machines in general but, be warned, it is not an easy read.

Mike James is a lecturer and author

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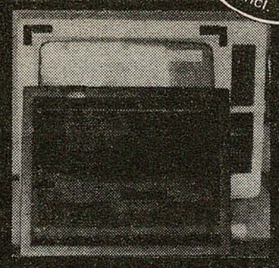

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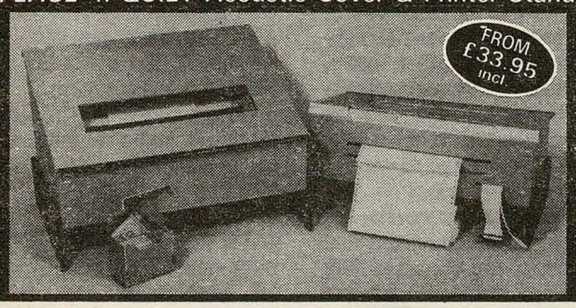

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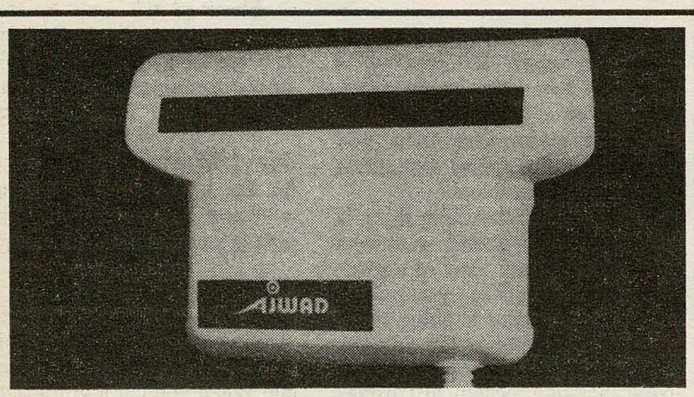

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● **PIC files in GW-Basic**
I have been desperately trying to load a *DR Halo* PIC file into GW Basic. If you could tell me how to do this my life would be made a lot easier.
R Pearce, Haywards Heath.

'Fraid not – there are dozens of different picture file formats and 'PIC' is an extension which many of them use for different file types. If you have any *DR Halo* pictures in the alternative 'CUT' format, a Shareware program called *Optiks* claims to read them (and a couple of dozen other formats) and can convert images from any one of its formats to any other, including GW-Basic BLOAD formats. But so far I have not been able to find anything to help you read the PIC files directly.

● **Hard disk interleave change**
Some months ago you explained how to change the interleaving on a hard disk. I did this with incredible results. Now I need to do this for a friend and I've mislaid the mag. Could you please explain again.
Clive Charles, Wolverhampton.

It may be because I don't recall explaining in *Shopper* exactly how to do it. Essentially you need to do a low-level format which will, of course, destroy all the data on the disk. So first start with a backup. Then you make another copy of your data because, of course, a backup isn't a backup if you don't have another copy somewhere! And backup programs don't always work (remember, you never find out if they haven't worked until you need them!).

Having done all this, you then have to do a low-level format: the method for doing so depends on the controller. Sometimes you will have a utility to do a format, otherwise you will have to run the DEBUG program provided with MsDos to run the formatter routine contained in the HD controller's BIOS ROM. Usually you will do this by typing DEBUG and then (when it replies with a little '-') G=C800:5 which should, with a modicum, of luck run the format routine.

On early Amstrad PC1512s, those with the Xebec drives, the low-level formatter does not do anything – Xebec happened to believe that users should not need to reformat their disks. Later Amstrad controllers, and some other manufacturers, had the format routine at address 6 rather than 5, so you would type G=C800:6 instead. If the disk controller has been set to the alternative address, the command would be G=CA00:5. In all cases trying the wrong command is unlikely to cause any damage, so experiment.

If all goes well, the format routine will ask you to enter an interleave factor – it usually suggests 4, although Amstrads need at least 7 with an MFM drive and 11 for an RLL drive (which has sectors closer together).

One problem that you will find is that if you have the new Seagate ST11R controller (which, being an RLL controller needs an interleave of 11 on the Amstrad) it refuses to do an interleave greater than 7. Seagate will be modifying this in future, but if you have the old one I would suggest using the *Disk Manager* program supplied bundled with Seagate drives.

An alternative to all this is to use the Shareware program *Diskopt,* available from user groups. This automatically chooses the optimal interleave factor and will then reformat the disk track by track replacing the data as it goes.

You still need to do a backup but it saves you a lot of work experimenting with alternative interleave factors and then restoring data.

● **Spectrum programs on a PC.**
I am purchasing a PC compatible but, having grown up using a Spectrum Plus, I have a large amount of software for it, both commercial and personal. It would be nice to run this on the PC if this is possible.
M Snape, Loughborough.

Unfortunately, the differences between the Spectrum and the PC make this extremely difficult. It is not just the difference in processors – the Spectrum uses a Zilog Z80 – for there are Z80 emulators available for the PC. It is really all the features of the Spectrum's ROM and the differences between its own individual dialect of Basic and the Microsoft dialect used on the PC. I have seen BBC Basic emulations on the PC, but whilst it would in theory be possible to do a Spectrum emulation, and I am sure that there would be quite a large market for it, I have not seen one as yet.

You can buy PC versions of many old Spectrum favourites such as the *Tasword* word processor. Apart from this, your best chance would be to copy any Basic programs which you have written yourself using a serial interface and then undertake the laborious task of altering them to a PC version of Basic.

● **Books index**
Can I ask your advice on choosing a suitable database? I want to be able to produce an index to several hundred books and be able to sort the records by any one of subject, author or title. Key points in selecting the software are user-friendliness and price.
D Garner, Cambridge.

Before I give the obvious answer of *PC File +*, perhaps you should consider what software you already have that could be used. *Lotus 1-2-3* or compatible spreadsheets, for example, provide an excellent tool to handle data sets small enough to fit into memory.

Whether it would meet your needs depends on whether you already have it and how many records you were thinking of. I know someone who runs a very large indexing system just using *Tasword PC* (or any other text editor) and a *PD Sort* utility from one of our user group disks. Again, each file must fit into memory.

If you do decide that you need a database program, a simple menu-driven one is all that you need. Don't get carried away into thinking that you need *dBase IV*! *PC File +* allows you to draw up your data entry/display form on screen and then start entering data straight away.

The package is entirely menu-driven and few people seem to find difficulty in using it. There is no need to specify which fields to use as an index: *PC File* automatically creates an index to the first two characters of every field.

To search for a particular record, just enter the first few letters of one or more field: to look up a membership number, for example, we enter the first few letters of the name and the first two letters of the postcode, then page through until we find the entry that we want.

The other big advantage is the report generator, which will set up simple reports for you or allow you to specify the exact layout that you want.

● **Superwriter**
I have been using *Superwriter* on an Apricot F1 series which I found to be easy to learn and use, though some may consider it old fashioned. I believe that there is a newer PC version of this available. If so do you know where I can buy it?
C Yorke, Stockport.

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● **Future Technology problems**
Some time ago I acquired a Future Technology computer but now I am having some problems with it. I have not got any documentation of a boot disk, and the file MPM.SYS on the hard disk has got renamed to MPM.OLD and so the bootstrap program will not recognise it. Is it possible to connect the hard disk to another computer and rename the altered file?
S Partridge, Grantham.

This shows just how important it is to make a bootable floppy disk whilst the hard disk is still working. When you get it going again, I would suggest that you experiment looking for utilities like *MOVCPM,* which might copy the operating system onto the reserved tracks of a floppy disk.

It should be possible to rename the file by attaching the hard disk to the hard disk controller on a PC (but preferably not an AT).

The physical interface of the hard disk to controller should be fairly standard although, the controller may get a bit confused about the number of heads tracks and so on that the disk has. Never mind, you only want to read one particular sector, which will be fairly near the start of the disk. Don't expect the PC to understand the disk format – it will be a CP/M format. Instead you need to use a low-level disk viewing and editing tool.

If you can read anything at all on this disk look, for the file name and alter it back.

Continued on page 175

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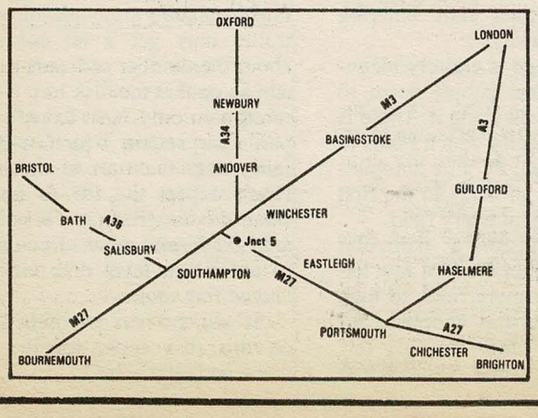

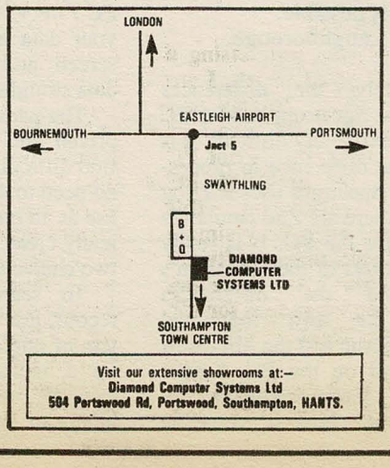

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Continued from page 173

● **Commodore PC 1 again**
I have a Commodore PC1 with single drive. Please could you tell me the cheapest way of adding a second drive?
K King, Mountain Ash, Glamorgan.

I suggest that you contact the Commodore PC1 User Group for advice. Norman Keylock tells me that it is a free group, operating on a round-robin basis, and would welcome any PC1 owners as members. You can contact the group at 26 Kings Drive Westonzoyland, Bridgewater, Somerset TA7 0HJ (and I bet that village name gives the proof reader a surprise!)

● **24-pin printer graphics**
I am trying to use a borrowed copy of *PrintMaster*, which produces signs, cards etc. Unfortunately, I can only use it on my son's Epson LX-500 printer as my Amstrad LQ5000 seems to give the wrong spacing. The problem is with the line spacing: the Amstrad steps at 1/6th of an inch whereas the requirement is for 1/8th of an inch.
P Gardner, Northampton.

Serves you right for not buying your own copy. Unfortunately, all graphics software designed for standard 9-pin Epson compatible printers will give an incorrect spacing on 24-pin printers. The reason for this is that vertical page movements have to be in a multiple of the pin spacing. So whilst on the 9-pin printers the basic unit of vertical movement was 1/72nd of an inch (equal to the interval between pins) on the LQ printers whose pins are spaced 1/180th of an inch apart the spacing is in units of 1/60th of an inch.

Consequently, the same graphics mode command which sets vertical spacing to 9/72nds of an inch on the LX500 will set it to 9/60ths of an inch on your LQ5000. The only solution that I can think of in this situation is to find a printing program (such as *Fontasy*) which properly supports 24-pin printers.

● **Amstrad extended keyboard**
Can you please tell me where I can get an extended keyboard for my Amstrad PC1640 similar to the one fitted to the new PC2086? I find the different layouts very confusing when switching between machines. On one alternative keyboard that I tried the mouse did not work properly. Is this the case with all of them?

Naga Electronics, (01) 208 0567, provides a replacement keyboard for just £59. Its feel is ideal for those who prefer a lighter action, so it should suit touch typists. Unlike other firms, Naga has taken the trouble to reproduce the extra wires in the keyboard connector which carry signals from the mouse to the keyboard processor which then passes them on to the cpu.

● **Wrong time**
I sent you a letter which you replied to in your March '89 Helpfile asking why my Amstrad PC displayed the current date and time instead of the date and time last used. You will be interested to hear that you were dead right in your prognosis – I had omitted to tell you that I have a Miniscribe 32Mb hardcard installed and when this is removed all my 'problems' evaporate.

However, I don't understand why this occurs if this device has been offered to a zillion Amstrad owners. Is there a way in which I can speed up the diagnostics? Who can I talk to about such things? The original supplier has disappeared off the face of the earth.
A Exton. Melksham.

Well, to answer the easy question first – who can you talk to – why the PC Independent User Group of course! That's just the sort of problem that our Helpline service is provided for.

Although you describe your hardcard as a Miniscribe, it is very unlikely that the whole thing was put together by Miniscribe. Instead, it was probably assembled here in the UK by a small firm using a Miniscribe disk drive.

If the initial diagnostics are taking a long time, it is quite likely that it is finding something that it does not like very much but eventually decides to accept. This could be that the formatter has told it that it has more tracks than really exist – it could be trying to find them before giving up.

Or it could just be that with the wrong interleave factor, data is taking three times as long to read as it should do. Reducing the stated number of tracks by one or two can also help.

● **Sanyo MBC555**
I am considering purchasing a Sanyo MBC 555/2 which, I am told, runs under MsDos and can read and write standard IBM 360k disks, but is not PC compatible. Do no IBM PC programs work on this machine, not even very simple ones? Is there much software for the machine? Are there any programming languages for it?
J Barney, Sheffield.

The trouble with the Sanyo, like many other computers that claimed some degree of PC compatibility, is that they only copied IBM in the operating system and processor used. If a program only uses standard MsDos facilities (and this applies to many utilities and to many business solutions software, such as accounting systems, databases etc) then it should work.

However, since programmers quickly found that much better performance and access to more features of the machine could be obtained by avoiding MsDos and using the BIOS entry points built into the PC itself, many programs rely on compatibility with the IBM BIOS.

Even this, though, is not sufficient, since the IBM BIOS routines for screen IO were quite slow and, for fast screen performance, it is necessary to directly write data to the video buffer.

It follows that programs such as word processors, spreadsheets or graphics applications which require fast screen output are very unlikely to work on the Sanyo. Nor are communications programs which find it necessary to directly access the serial port hardware registers.

Memory-resident programs will also almost certainly resort to undocumented functions that will not work either. Some programs such as Peter Norton's disk utilities and the Shareware database *PC File*, have a special option to tell them to use Dos and not to directly write to the screen, so these can be used. Finding out which programs do or don't run is going to be time-consuming and the numbers of programs that you will be able to use will diminish over time as more and more software authors update their programs using PC specific features.

If your word processor on the Sanyo is compatible (for example, if both machines use versions of *Wordstar*) you should be able to take files typed on the Sanyo and edit or print them on your office PC. There are various language compilers available in generic MsDos versions.

Prospero Software, for example can advise you which of its range might run. I seem to recall that older versions of Borland's *Turbo Pascal* ran on non-PC machines, though later versions may have dropped this support.

● **Mailshot**
I have been looking for some time for a software package to allow me to mail-shot my customers according to what they have already purchased from me. I should imagine that this is quite a common requirement, but all that I have been able to find so far is an expensive service department package which is designed to sort on product codes.
MS Passingham, Penn, Bucks.

First you must think about exactly how much data you need to hold for each customer and the form in which you are going to hold it. The conventional sales ledger will consist of a master file with account details for each customer and then a whole series of transaction records, one for each invoice.

Depending on your accounting needs you could either use a top-end accounting package such as *Sage Financial Controller* which, apart from keeping your accounts, will allow you to generate reports on, for example, all customers who bought a particular product within the last year, or customers who have not purchased anything for six months. The same sort of thing can be achieved with more flexibility and a little more work using a relational or transactional database. Unless you are a programmer, choose a menu driven one such as Compsoft's *Delta*.

However, none of these kinds of package are going to work very well on a floppy disk – they all really need a hard disk and, if you tend to have many customers, but only one or two orders from each of them, a single 'flat-file' system would probably be better. Here, instead of having a master file of account details and then separate records for each transaction, you combine the two.

The file could then contain one record for each transaction (in which case you would have to run an option to eliminate duplicates of the same name and address before doing a mail-shot) or else could simply have one record for each customer, which would include details of their latest purchase from you. This last option would be the simplest to use, provided that you can do without the information on previous sales.

Contact
You can write to Paul here at *Shopper* or at:
The Computer Advice Centre,
87 High Street,
Tonbridge,
Kent TN9 1RX
(0732) 77 1512

Paul Mullen is an independent computer consultant and the part-time Chairman of the PC Independent User Group, which is a non-profit-making club set up to provide help and advice to all owners of Amstrad or other low-cost PCs. He is busy creating a home for unwanted and stray hard disks under the guise of a data recovery centre

CORRESPONDENCE

Readers' writes

Write to: Computer Shopper Letters, 14 Rathbone Place, London W1P 1DE. The letter of the month wins six months' subscription

Technology gap

Dear Shopper,
Six weeks buying my PC, and after many sleepless nights, I discovered that MsDos is not as fantastic as I, or the magazine I was reading at the time, thought it was. "Never mind, there's a tutorial starting next month in *PC Wonderful*, taking beginners through the programming language C". You mean MsDos isn't a language?!

Whilst waiting for the next issue of *PC Wonderful* to arrive, I noticed a magazine article stating that, for serious use, nothing less than a 20286 AT Turbo 40Mb HD, etc etc, would be any good. How dare they? You mean my cute little 8086 won't be any use when I decide to become self-employed? Why didn't they tell me that when I bought my PC?

Having taken the step from the games-orientated machines to a PC because of business needs, people are faced with the prospect of choosing a machine which they know very little about. To make things worse, many magazines often test only the higher specification machines, which are beyond the range of the small business or the self-employed. Does a small garage, for instance, require a 20386 machine with 300Mb of hard disk?

This leaves people like myself wondering: "Was it worth buying that 'bargain' 8086 or 8088 machine? Will I need to upgrade and will I still be able to buy software in three years' time when everybody else has got a 20386?" People who own a PC XT, for example, reading through today's magazines, are starting to feel pressurised by the continuous raving on about those wonderful 20386 machines, which the majority of PC users will never be able to afford and will never need!
Clive Sinclair, Hants

I utterly disagree with the comments about the AT Turbo and I would go so far as to say that, unless you have a Cray supercomputer interfaced with an Amiga 2000 and networked to an Archimedes, you aren't even in the game!

Look – how many times does this have to be said? Don't get drawn into techno-snobbery. If the computer you have does the job then that's all that matters. If you are happy with motorway travel in a Metro then why worry? (Actually I would worry about not being worried about that!). The only consideration you must bear in mind is how well your computer of the moment will cope with your future requirements. The burden of the problem tends to be caused by programmers cramming more into applications because the latest generation of computers runs faster and the user probably won't mind. They tend to forget that massive applications run like two-legged dogs on older systems. Just remember, when you come to buy an application, that you will probably get more joy from an older program, written in good old assembler, than some great C monster.

Anyway, my information has it that 40 per cent of IBM-type PCs in use are 4.77 8088 machines. Ha ha ha.

GS for Go Slow?

Dear Shopper,
It was nice to learn that, in this hectic age, life at Molloy Mansions (April, page 127) is conducted at a pace and in the peace associated with a medieval monastery.

It would be equally nice to be able to work at the same gentle amble but, alas, it can't be so. I, for one, won't be using Appleworks GS until:

1) It loads from a 3.5" drive in one minute, not five minutes.

2) The printer driver is upgraded to allow an Imagewriter to print a page in, say, a tenth of the 15 minutes it takes at the moment (or the 10 minutes promised us with the latest GS/OS).

3) Beagle Brothers has had time to produce an equivalent of its range of Time-out accessories for Appleworks.

Since it looks as if such happy days will take a good couple of years to get here, I'll be operating my business through good old (underrated) Appleworks and Time-out, and moving at a rate that will allow me to compose and print a letter in six or seven minutes.
Michael Corgan, London

Thank God someone is making a stand against over-pretty and very cumbersome software. I am convinced that many software designers would do things differently if they had to stand about, kicking their heels, while the computer grinds on. Too many features do not a good program make.

Molloy managed to work at such a gentle amble this month that he missed all our copy deadlines, which is why his column doesn't appear in this issue. We don't know whether this is because he's still waiting for his copy to print out or because he has gone overboard with the monastic lifestyle and shunned the outside world.

Setting up Sage

Dear Shopper,
I am thinking of setting up an Atari ST Users' Group, named Sage, which represents wisdom and learning. It will be a self-funding group which will publish a monthly magazine, with all the articles written by members of the group. If anyone is interested, please drop me a line, to: Sage, David Pullin, 3 Beacon Road, Shevingtonmoor, Standish, Wigan WN6 0SB.

It would help me if you send a stamped, addressed envelope and write down what you would like to see in the magazine and what else you wish the club to offer you.
David Pullin, Wigan

If all goes well, perhaps Richard Monteiro will give you another mention when everything is underway.

Yes Reichsminister

Dear Shopper,
I can well understand why MacBiter receives threats of violence from 'Middle-aged Merseyside Teddy boys'.

MacBiter's item entitled 'Clot' really was a piece of monumental rubbish.

The Deutsches Reich existed from 1871 (with a pause between 1919 and 1933). It could therefore be argued that any German minister of that period was a Reichsminister, even Bismarck. Would that be such an insult? *Zygote* does not deserve the lampooning he received.

I can't understand why MacBiter reacted so strangely to *Zygote*'s column. It may not be everybody's opinion, but even I understood that 'Reichsminister Baker' was meant to be humorous (and quite probably true!).

Perhaps it was because MacBiter could find nothing else to fill the column inches. If so, you should use the space for something computer-related; if MacBiter wants to do this sort of thing, he should use *Shopper*'s letters page.
DJ Caunt, Nottingham

OK, that's enough. Poor Lynn is doing her nut sorting the pro-*Zygote*s from the pro-MacBiters (*Zygote* seems to be winning on a popular vote). It's all over now and this is the last we are going to hear on the subject. Really, it is – unless Mr Baker would like to drop us a line.

Goupil fan club

Dear Shopper,
Talk about coincidences! For some time I had been contemplating the possibility of entering the mysterious world of the PC. I did – with the Goupil Club laptop. I had doubts about the machine as I had never heard of it before.

Then I bought the April edition of *Shopper*. Many thanks to John Minson for a first class report – especially the warning about the dangers of the connector touching the machine's metal case.

It was a relief to find someone who has had a few months' experience with the Goupil. I bought mine from Tradermail in Worcester for £495 including VAT.

I would be obliged if John could tell me if it is possible to connect the Goupil to a TV set. Also, would the machine run on another version of MsDos, 3.20 for example?

In my opinion, the Goupil Club is a well-made and, so far, reliable piece of equipment. I would recommend it as a second computer and as a relatively inexpensive road into the PC world.
Colin P Langeveld, Liverpool

Nice to hear from another owner of this unjustly neglected machine. Apparently, a lot of people were tempted by my reappraisal and swamped UK Home Computers with enquiries, only to find that the company has run out of stock.

Continued on page 178

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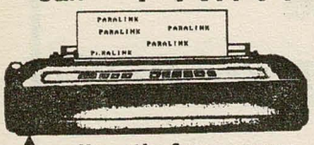

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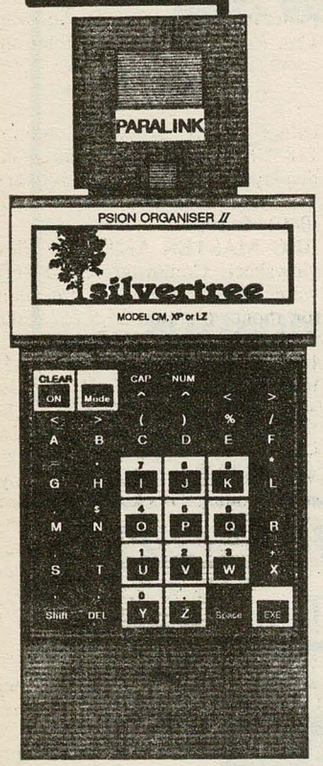

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Continued from page 176

However, limited stocks are available from Morgan Computer Co, (01) 255 2115, though at a higher price of £595.

In answer to your first question, the Club does output a composite video signal but it's NSTC, the American TV standard. There are, however, connectors available which allow you to connect a portable PC to a standard television and I'll be looking at these in a forthcoming issue. As for using later versions of MsDos, I'm currently using version 3.3, scrounged from another machine, and it behaves perfectly.
John Minson

CONFIG.SYS setup

Dear Shopper,
The CONFIG.SYS file, as supplied with the IBM PC1, is already set up for a 3.5" external drive – see page 251 of the MsDos manual, which states that 'If you do not specify the /f: switch DRIVPARM uses a default of 720Kbytes'.

Mr Hancel (March issue) only has a problem if he wants two 5.25" drives.

Modified CONFIG.SYS for 5.25" external drive:

Original CONFIG.SYS
Buffers=5
DRIVPARM= /d:01
Device=ANSI.SYS
Country=049

I should welcome Mr Hancel to our free Commodore PC User Group; the address is: Freepost BS6 5II, Bridgewater, Somerset TA7 0BR.
Norman Keylock, Somerset

Letter of the month

Dear Shopper,
A few issues ago, Huw Collingbourne was waxing lyrical about *Desqview*. He also asked, via the CIX bulletin board, for comments from other users. The responses were short and to the point – 'why use anything else?'.

That was also my view. However, my recent experiences have been somewhat trying, and they are, perhaps, worth recording for the benefit of other potential users.

Most of the recent reviews have been occasioned by the release of the 386 *Desqview*, and in that context my comments may not be relevant. But the earlier version can be used on any PC and, in my case, it runs on an Amstrad 1512 with 640K RAM and a hard disk, with MsDos 3.2. Tuning the parameters to fit the mix of programs in the available RAM can be tricky, and the inevitable swapping to disk makes 20 seconds seem like eternity. But at the end of the day, I wouldn't (couldn't) be without it.

I have a 20K non-swappable Dos window for those itsy-bitsy housekeeping tasks. The other windows are for *PCTools*, *VP Info* (a powerful but strangely ignored *dBase* clone), *Protext* and *Masterfile* – plus a few modest PopUps. All work well, except that the cut and paste facility does not paste into *Protext* – owing to the native *Protext* keyboard driver. *Protext 4* has a messy way around this problem, but I can never remember it when I want it, and finding things in the *Protext* manual is a matter of serendipity.

The problems started when I tried to run a complex *VP Info* program that had five open databases with massive indexes. The program crashed. A colleague reported that the same program crashed in a similar *Desqview* environment and, on the same day, she also reported two occurrences of fatal error – 'Internal stack failure'. Two fatal errors suggested a call to the engineer, and his response was to increase the buffer's size to 30 – a baffling solution but, since there have been no further fatal errors, I have to remain speechless.

Then *PCTools* crashed (gracefully). 'Not enough file handles', it said. That caused me to think about the Files size, which was set at 20. All my manuals (including *Desqview*) suggest about 20, but add some for database sorting (not mandatory, says the *Desqview* manual). Dos 3.2 will take up to 255, so I thought that if that number is provided then there must be occasions when more than 20 is needed, and perhaps I had hit upon such an occasion.

But the Amstrad manual says, quite unequivocally, that the Amstrad PC has a limit of 20, and that setting a higher figure is not effective. I couldn't understand how the Amstrad could shackle Dos, and none of my Dos guides said that Files was hardware-dependent.

I spent the afternoon in the local bookshop, which has an amazing selection of Dos guides. All but one gave the same, limited, advice about Files. But then I struck gold – *Dos Tips, Tricks and Traps* by Chris DeVoney: 25 pages on CONFIG.SYS commands, including several pages on the Stacks command – I had never heard of it; it wasn't in any of my books. In spite of the £20 price tag, I had to have such a book.

It turns out that Stacks came in with Dos 3.2, but few people seem to have noticed it, or cared. Before 2.2, Dos used one stack for storing values and memory addresses. When the stack overflowed, all sorts of undesirable things could happen. Perhaps a heavily burdened *Desqview* could cause the stack to overflow. In 3.2, the default value is nine stacks of 128 bytes. 'If you have a problem with Internal Stack Failure, try Stacks=12,256 for starters' says DeVoney. Sounds a better answer than Buffers=30.

By the time I got to Files=40, my database program worked with my *Desqview* mix. I then threw everything at *Desqview*. I opened a window, opened a program, opened as many files as was sensible, swapped out, and went right through the menu in my standard mix. I needed Files=55 for the database program to work in that environment. So, on a standard PC at least, a hard-driven *Desqview* seems to eat file handles for breakfast. But, unlike Buffers, Files consumes little RAM, and the overhead is negligible.

So I am now back where I started – an enthusiast for *Desqview* – albeit with a slightly lighter pocket. Would that I had a pocket that could finance a 386. Perhaps I should become a computer journalist.
Alan Smith, Stockport

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Continued on page 181

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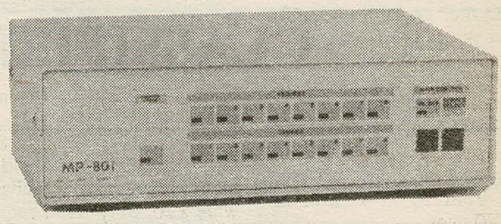

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T199/4A USERS' group (UK) will hold its AGM on Saturday 17th June 1989 at the Romiley Centre, Compstall Road, Romiley, near Stockport, Cheshire from 10 am to 5pm. There will be something to suit all ages and interests after the official business has been concluded so come along and rediscover the joys of the TI99/4A.

ZX81 AND the 16K Speccy club. Write to Robert Frosdick, One Northolme Close, Grays, Essex RM16 2NX for details now. Reviews, compos, gifts etc..

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BULLETIN BOARDS

Erratum

In the April 1989 issue of Shopper we printed an incorrect number for the Merlin BBS. The correct copy should read.

MERLIN BBS. Download for music 500/0 BBC, Amstrad, QL and PD. BBS software for PC, BBC and Amstrad. Tel (0443) 834179 V21, V23, V23v. *(Our apologies for any inconvenience caused as a result of this error).*

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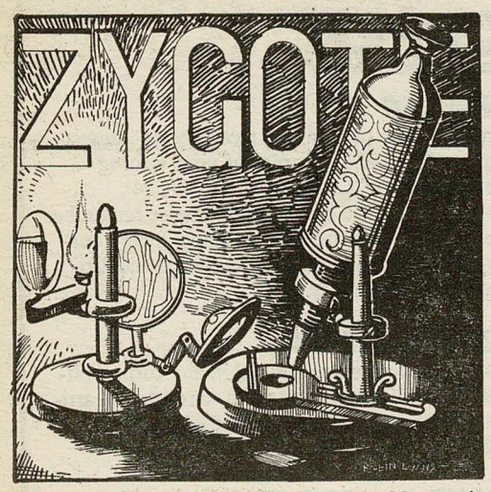


HOT STUFF

Ken Blakely supplies computer controlled 'hot beverage units' to the US Air Force at $3,046 a throw. When queried about the hefty price tag, Mr Blakely said that his units could withstand high altitudes, variable temperatures, electromagnetic interference and 'plane crashes'! He added, "if it gets out of control, you have a bomb on the plane." *Zygote* suggests the computer be reprogrammed for 'hot beverages' to be dispensed when the coffee machine withstands its self-inflicted crash: hot sweet tea for shock, blood plasma and a saline drip for the injured and, while the rescue team is awaited, some nice decaffeinated coffee. Caffeine is bad for your health.

SPOT LIGHTS

By popular request, we continue to place radiation hazards emitted from VDUs under the *Zygote* microscope. As the media gleefully focuses on that notorious NASA report which states that 70 per cent of computer faults are related to static electricity generated by nylon undies, and everyone from IBM to Zurich Insurance bombards my desk with press releases concerning the Undie Factor, it has already been explained that women do not pose a danger to computers, but that computers do pose a lethal threat to women.

In the interests of sexual equality, let us look at that sea of young male faces which gathers in solemn ritual at all computer exhibitions. These faces are riddled with acne and decorated with spectacles. Here's the reason why. Irritant dermatitis, rosacea, and the gloriously named poikiloderma (spots, rashes, blotches and raw flakes of skin) is epidemic among computer users, and almost universal among those individuals who have the habit of touching their screens and their cratered faces. This affliction serves to transfer charged airborne particles which are responsible for the dermatitis. Blocking agents in the form of skin creams containing two per cent titanium dioxide with iron oxides are recommended to reduce this contact, and also to leave gunge all over the screen, thereby dissuading users from fingering the danger zone. Cleaning the screen before every usage also helps. The Norwegians recommend using anti-static floor surfaces, although, at time of writing, it is not clear if they are simply sweeping the problem under the carpet.

As for all those Woody Allen glasses that congregate at computer fairs, last August, the University of California's optometrist confirmed that deterioration in eye focusing is the number-one problem for all VDU users under the age of 35. Headaches, back strain, finger spasms and even seizures were also caused by that malevolent glowing box, but damage to eyeballs topped the list by a factor of five to one. *Zygote*'s advice, more now than ever before, is to switch to LCD portables before it's too late.

TARNISHED IMAGE

Two themes emerged strongly from the recent Computer Arena '89 circus, held in luxury surroundings in the historic but overcast city of Palma. The delegates agreed to co-operate at long last to improve media image and to back the Federation Against Software Theft to the hilt. Like converts whipped up during an evangelical rally, magazine publishers agreed to contribute free publicity, software houses pledged to issue government 'wealth' warnings on their packaging and certain distributors and hardware manufacturers volunteered to include FAST propaganda with each product sold.

Indeed, the fact that FAST coordinator Bob Hay emerged triumphant from the conference is even more remarkable when it is realised that he was a last-minute replacement for the Invisible Man, Activision's Rod Cousens. Mr Cousens was eventually conjured up in the form of a ventriloquist's dummy, manipulated by someone resembling a cross between Ghandi and Jack Nicholson, but that's another story.

Zygote appealed for information regarding fascist software in this column four issues ago, and now Bob Hay warns us all to be on the lookout for a despicable pirate version of Mastertronic's *Sidewinder*, which has alarmed members of Glasgow's Asian community. Retitled *Pakibasher*, the hackers have corrupted the game to include turbanned Asians on flying carpets representing targets, and invite players to 'wipe the bastards out of existence'.

Once again, *Zygote* invites readers to forward any information which can be applied under the 1936 Public Order Act, and which can result in up to two years' imprisonment for those responsible.

Mr Hay has rightly been quoted as saying that this incident "provides a terrible reflection on the industry as a whole". It is, perhaps, just as well that the only leading software house which was not represented at Computer Arena '89 was US Gold, which has not bothered to wait for pirates to mutilate its product, but has done it in-house. In US Gold's *Human Killing Machine*, young boys are encouraged to voyage the world, killing stereotyped 'deadly enemies' such as Igor (a lousy commie), Miguel (a dago, or Argie, or some such greaseball), Hans (a drunken Kraut), and 'merciless terrorists of Beirut', who are unspecified as to their Christian or Muslim proclivities, but what the hell.

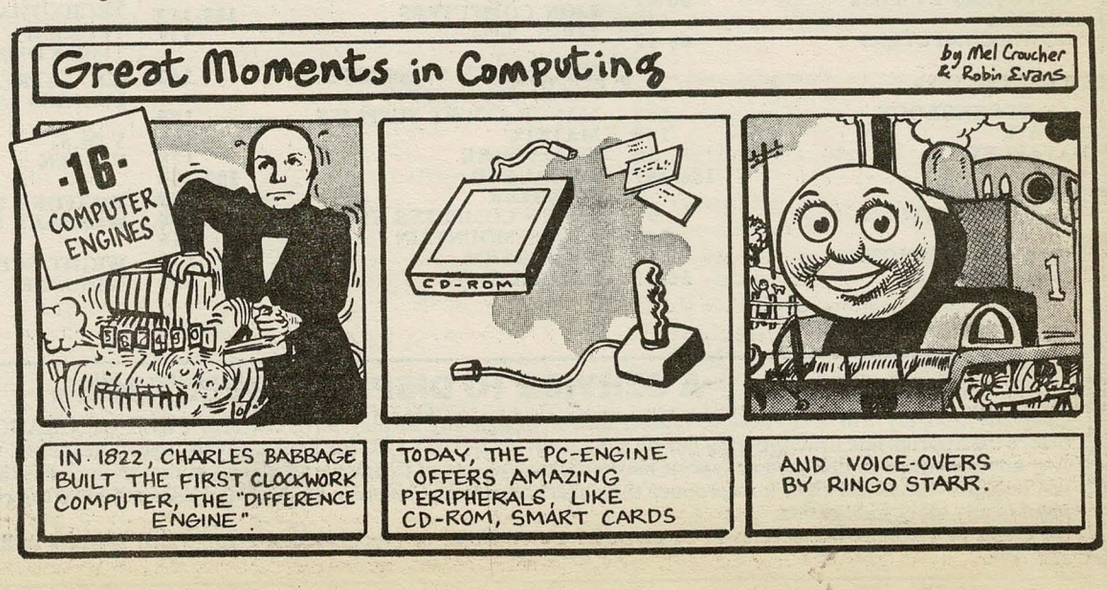
This is boring, pitiful stuff, but there is another utterly sick target offered as you 'carve out a path of savage destruction.' The targets are not 'Pakis' but women. To be precise, Maria and Helga, two Amsterdam women working as prostitutes.

As these targets obviously reflect this particular software house's concern for our industry's image, it is a wonder that the product has not been endorsed by the Yorkshire Ripper.

CD TALES

Will any readers who can answer the question "What is the ITALIC Project?" please make themselves known to *Zygote*, who is sick to death of the secrecy and misinformation currently surrounding the damn thing. All that is known is that ITALIC is a gigantic EC-funded scam, involving a large electronics company in the south east of England, at least two European universities and a whole host of artificial intelligence and linguistics experts.

The most attractive rumour concerns a CD-ROM multilingual voice-based desktop publishing system, with phonetic punctuation by Victor Borge; the most unattractive involves Kenneth Baker and the results achieved by dialling (089) 860 0581. Non-believers may dial this number now!



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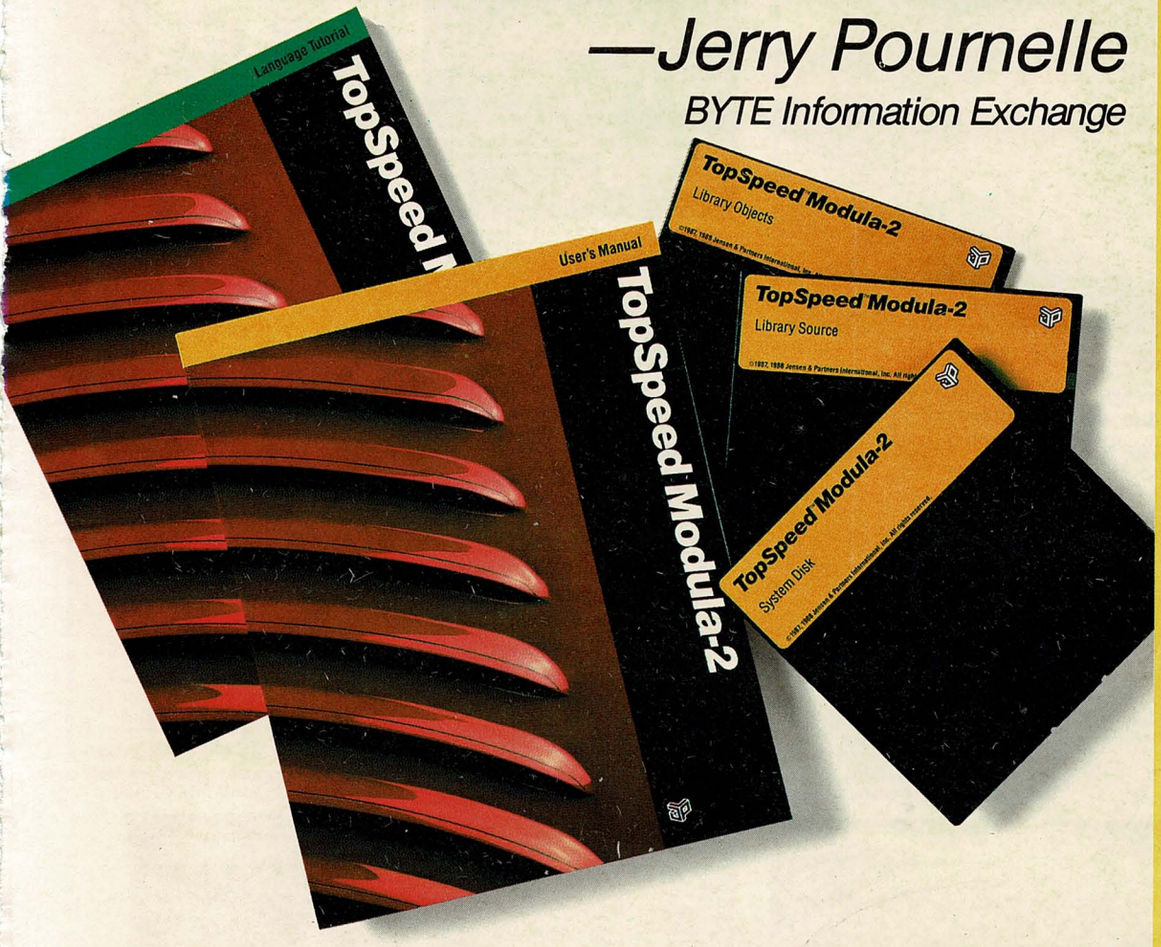

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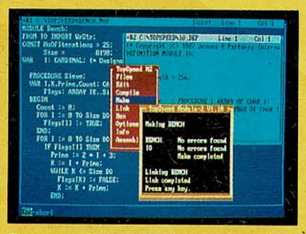

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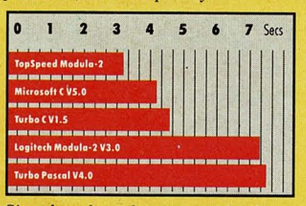

Sieve benchmark measured by the British Standards Institution (BSI)— 25 iterations on an 8MHz AT.

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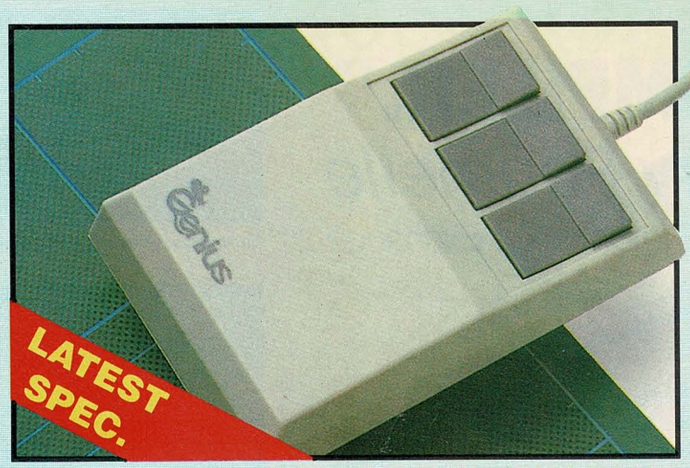

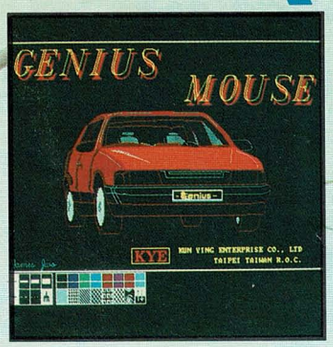

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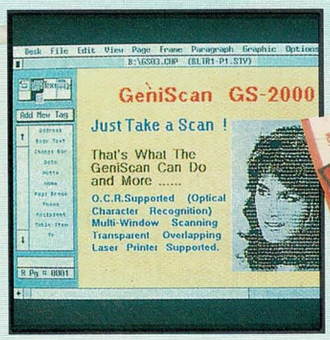

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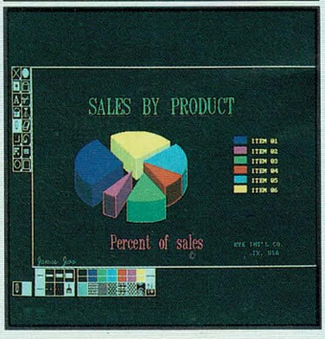

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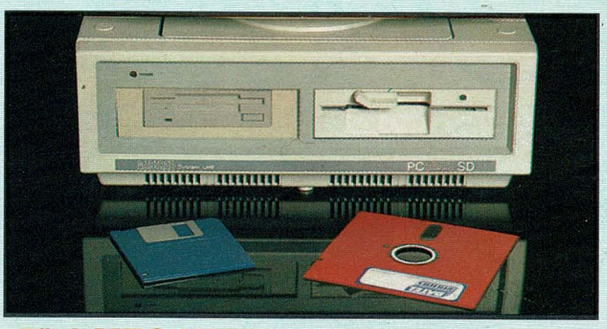

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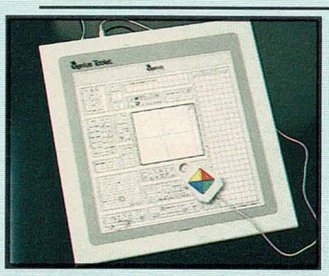

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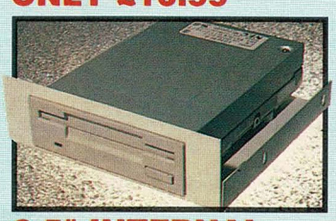

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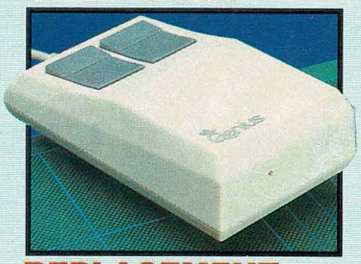

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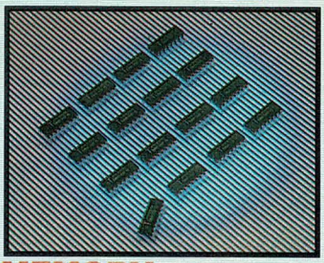

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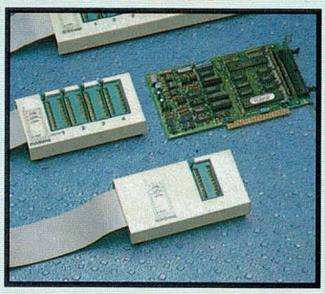

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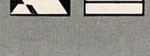

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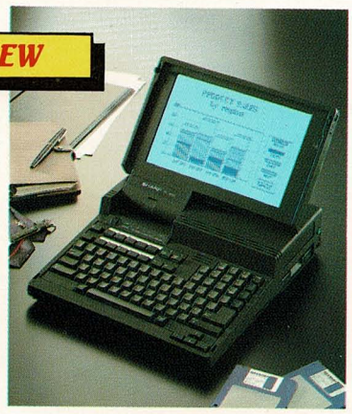

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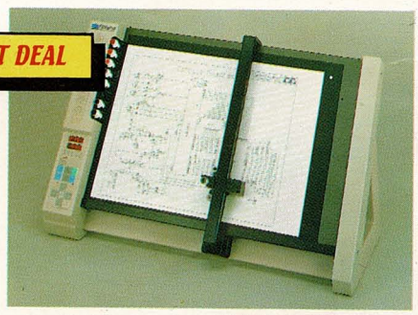

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TANDON						
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PCA 20 20Mb Hard Disk	–	£1029	–	£1329	£1189	£1399
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PCA 20+ 20Mb Hard Disk	–	£1089	–	£1389	£1259	£1469
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PC4-60 60Mb Hard Disk	£1599	£1699	–	£1999	–	£2139
PC5-60 60Mb Hard Disk	£2599	£3199	–	£2999	–	£3399
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AX-80 80Mb Hard Disk	£1899	–	–	£2259	–	£2379
PCe 20Mb Hard Disk	£875	–	–	£1195		
PCe Double Floppy	£925	–	–	£1245		
OPUS						
Opus PC 111	–	£869	–	–	–	–
Opus PC V	–	£1119	–	–	–	–
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PS/2 30-286 20Mb Hard Disk	–	£1449	£1549	£1749	£1599	£1749

† Atari Mono Monitor is an EGA Mono. ‡ Tandon VGA White Monitor * Amstrad 12" EGA (ECD)

PORTABLES

	cpu	Speed	No of Fipy	Hard Disk	Screen Type	Our Price
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T5100	386	16MHz	1x1.44	40Mb	Plsma	£3450
T3200	286	12MHz	1x1.44	40Mb	Plsma	£2995
T1600	286	12MHz	1x1.44	20Mb	LCD	£2449
T1200HD	8086	10MHz	1x720	20Mb	LCD	£1795
T1200FD	8086	10MHz	2x720	--	LCD	£1299
T1100 Plus	8086	4.7MHz	1x720	–	LCD	£975
SHARP						
PC-4602	8086	–	2x720	–	LCD	£1099
PC-4641	8086	–	1x720	20Mb	LCD	£1859
PC-5541	286	12MHz	1x720	20Mb	LCD	£2969
EPSON						
Portable HDD	V30	10MHz	2x720	–	LCD	£925
Portable FDD	V30	10MHz	1x720	20Mb	LCD	£1439
AMSTRAD						
PPC512	8086	8MHz	1x720	–	LCD	£379
PPC512D	8086	8MHz	2x720	–	LCD	£529
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PPC640D	8086	8MHz	2X720	–	LCD	£579

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